The Relationship Between Body Image, Eating Behavior and Nutritional Status for Female Athletes

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Abstract

Objectives: The present study was conducted by using the cross-sectional study design and to determine the relationship between body image, eating behavior and nutritional status in female athletes. Methods: This study was conducted by using the cross-sectional study design and the sample was comprised of 80 female athletes who volunteered to participate in the study between January and March of 2018. Findings: This study demonstrated that 70.0% of the female athletes had skipped a meal. Also, female athletes had a normal BMI but 65.0% of them indicated that want to be thinner. On the other hand, we analyzed that their daily nutrients intake, so we observed that 43.4% of the energy was from the fatty acids, especially saturated fatty acids, and they had lower fiber, calcium and iron intake. Also, we found that BMI, waist circumference, waist to hip ratio were negatively correlated with Multidimensional Body-Self Relations Questionnaire and The Dutch Eating Behavior Questionnaire score and they were lower in who had meal skipped or not received diet therapy. **Conclusion**: The findings of this study indicate that nutrition education is frequently neglected in sports programs. There is a paucity of nutrition education interventions among different sports.

Key words: Female Athletes, Body Image, Eating Behavior, Eating Disorders, Nutritional Status

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Introduction

Body image is a broad and dynamic concept that extends across perceptual and attitudinal modalities (Varnes et al., 2013; Pepe, Özdemir & Mustafa, 2015). The term body image is an extensive term encompassing many constructs. These include, but are not limited to: weight (dis)satisfaction, body (dis)satisfaction, body shame, appearance (dis)satisfaction, appearance evaluation, body esteem, body appreciation, body dysmorphia and body schema (Tylka & Wood-Barcalow, 2015; Moradi & Varnes, 2017;). Especially among female athletes,

body image is associated with several heath issues such as disordered eating, mood disorders, decreased self-esteem or nutrient deficency (Piacentino et al., 2017; Nikiforos et al., 2017; Robbeson, Kruger & Wright, 2015).

Actually, it is expected higher body image perception in the athletes. However, since the turn of the 21st Century, the sexual objectification of especially female athletes in the media has increased and the definition of ideal female beauty now includes appearing athletic, in addition to being thin (Kantanista et al., 2018; Kim, Sagas & Walker, 2011; Daniels, 2009; Kafkas et al., 2014). So these changes are caused a great under pressure in the female athletes on body image perception (de Oliveira et al., 2017). On the other hand, some studies have suggested a higher frequency of eating problems in female athletes, particularly in athletes competing in sports that emphasize leanness or a low body weight (Fatima, Noor, Khan, Bashir & Fatima, 2018; Plateau, Arcelus, Leung & Meyer, 2017). Meyers (2015), et al found that 50.7% athletes were at risk of eating disorders. In another study showed that mostly college athletes had low EAT- 26 score which leads to dieting, fasting and disordered eating behaviors (Kalista et. al, 2014). Another study with 224 elite Australian athletes of which 118 were females and 106 were males showed that, 46.4% of them were suffering from mental disorders including depression (27.2%), eating disorder (22.8%), general psychological anxiety, social illness (14.7%), generalized anxiety disorder (7.1%) and panic disorder (4.5%) (Gulliver et al., 2015).

Generally, nutrition plays an important role in sports performance because it helps an athlete to maintain ideal body weight, body composition specific to sports and faster recovery (Beck, Thomson, Swift & Von Hurst, 2015). However, calorie deficit and higher fat intake especially saturated fat and dietary cholesterol, was observed in female athletes such as soccer players, runners, rhythmic gymnasts, volleyball players and weightlifters compared to recommendations (Braun, von Andrian-Werburg, Schänzer & Thevis, 2018; Naughton et al., 2016; Martin, Lambeth & Scott, 2006).

These results suggest that athletes constitute a unique population, especially impact of factors such as training, eating pattern, extreme diets, restriction of food intake and psychopathological profile. Therefore, the present study was conducted to determine the relationship between body image, eating behavior and nutritional status ın female athletes.

Methods

This study was conducted by using the cross-sectional study design and the sample was comprised of 80 female athletes who volunteered to participate in the study between January

and March of 2018. Exclusion criteria included gender, pregnancy and lactation. Data were collected through self-administered questionnaires. Meanwhile for BMI, height and weight were taken to be classified based on WHO Global Database on Body Mass Index (WHO, 2008). Respondents who have a BMI lower than 18.50 kg/m^2 was classified under the category of underweight. The normal range that is considered as ideal BMI range is 18.50 to 24.99 kg/m^2. However, BMI that is within the range of 25.00 to 29.99 kg/m^2 and those who are over than 30.00 kg/m^2 was categorized under the overweight and obese category respectively. Additionally, waist and hip circumferences were taken to be classified based on Waist Circumference and Waist-Hip Ratio Report of a WHO Expert Consultation (WHO, 2011). The recommended sex-specific cut-off points for the waist circumferences of women are 80 cm for increased risk, 88 cm for substantially increased risk; waist–hip ratio of women are ≥0.85 cm for substantially increased risk.

Nutritional behavior of participants was determined by food consumption frequency. Nutrient Database (BeBiS, Ebispro for Windows, Germany; Turkish Version/BeBiS 7) was used to determine energy and nutrient intake; results were compared to Dietary Guidelines for Turkey (Dietary Guidelines for Turkey, 2006). Additionally, eating behaviors of participants was determined by The Dutch Eating Behavior Questionnaire (DEBQ). DEBQ is a 33-item self-report questionnaire to assess three distinct eating behaviors in adults: (1) emotional eating, (2) external eating, and (3) restrained eating (Bozan, Bas & Asci, 2011). Items on the DEBQ range from 1 (never) to 5 (very often), with higher scores indicating greater endorsement of the eating behavior. Perceptions of body image were measured using Multidimensional Body-Self Relations Questionnaire (MBSRQ). The measurement is the composite of the 12 items and higher scores indicate greater behavioral and attitudinal investment in appearance (Dogan, 1992).

Data were analysed with SPSS version 17.0 (Inc.,Chicago, IL, USA). Comparisons groups were made using the Mann-Whitney U test. Both the Pearson and Spearman Rank Order coefficient were used to test for possible correlations among the different variables tested, depending on whether the data were normally distributed or not. $p < 0.05$ was set as statistically significant.

Results

This study has successfully interviewed 80 female athletes in Ankara, Turkey. As shown in Table 1, the mean ages of athletes were 22.5±6.78 years and 92.5% of them were the college graduate. For the "classification of the sport" majorly 35.0% of them were basketball players

and 28.8% of them were volleyball players. Athletes have been training 3.94±1.85 days a week and 2.16±0.96 hours a day. Based on the mean BMI of the athletes was 22.7±3.14 kg/m^2 and the mean waist circimference was 76.0±9.12 cm.

Table 1. Characteristics data of athletes

Characteristics	n (80)	%
Classification		
Basketball	28	35.0
Volleyball	23	28.8
Flag football	15	18.8
Indoor soccer	8	10.0
Ice hokey	6	7.4
Education level		
High school graduate	1	1.2
College graduate	74	92.5
Master / PhD graduate	5	6.3
Age, mean (±SD)	22.5±6.78	
Training (day/week)	3.94±1.85	
Training (hours/day)	2.16±0.96	
BMI, (kg/m^2)	22.7±3.14	
Waist curcimference, (cm)	76.0±9.12	
Wasit to hip ratio, (cm)	0.73±0.70	

Overall, we found that 70.0% of the athletes had skipped a meal and most skipped meal was breakfast (53.3%). In this study, the mean of the number of main meals was 2.45±0.63 and snacks was 1.97±1.07. The mean DEBQ score for athletes was 91.3±24.49. 65.0% of athletes said that want to be thinner and 68.7% of them had a diet therapy before.

Daily mean energy (1984.3±816.42 kcal) and nutrient intake were assessed and we observed that 43.4% of the energy was from the fatty acids, especially saturated fatty acids (49.1±10.32).

Additionally, lower nutrient intake level was assessed and we found that daily fiber intake was 19.6±10.86 gr, calcium intake was 277.0±123.79 mg and iron intake was 12.5±4.99 mg (Table 2).

Table 2. Eating behaviors and nutritional status of athletes

Eating behaviors	n	%
Skipping meals		
Yes	56	70.0
No	24	30.0
Which meal to skip		
Breakfast	32	53.3
Lunch	17	28.3
Dinner	11	18.4
for current weight		
I wish I were thinner	52	65.0
I am satisfied	22	27.5
I want to gain some weight	5	6.5
for diet therapy		
Yes	55	68.7
No	25	31.3
Main meals, mean (±SD)	2.45±0.63	
Snacks, mean (±SD)	1.97±1.07	
DEBQ score, mean (±SD)	91.3±24.49	
Nutritional status, mean (±SD)		
Total energy (kcal/day)	1984.3±816.42	
Carbohydrate (TE %)	39.2±9.02	
Protein (TE %)	16.1±3.59	
Total fat (TE %)	43.4±6.72	
Saturated fatty acid (%)	49.1±10.32	
Monounsaturated fatty acid (%)	34.1±13.40	
Polyunsaturated fatty acid (%)	16.8±11.59	
Fiber (g)	19.6±10.86	
Vitamin A (µg/RE)	966.0±353.58	
Vitamin E (mg)	12.1±7.85	
Thiamine (mg)	0.8±0.33	
Riboflavin (mg)	1.6±0.63	
Niacin (mg)	11.9±4.75	
Folate (mcg)	271.7±116.66	
Vitamin B_6 (mg)	1.34±0.61	
Vitamin B_{12} (mcg)	5.5±2.52	
Vitamin C (mg)	2030.6±1043.44	
Calcium (mg)	277.0±123.79	
Magnesium (mg)	1242.8±486.18	
Iron (mg)	12.5±4.99	

In this study, we assessed body image perception among athletes and we found that the mean MBSRQ score was 198.0±30.90. Table 3 shows that the correlation between body image perception, eating behaviors, nutritional status and some characteristics. Accordingly, age was negatively correlated with MBSRQ score (r= 0.279, p=0.01). BMI, waist circumference, waist to hip ratio were negatively correlated with MBSRQ and DEBQ score but these differences were not statistically significant. Additionally, the main meals number were negatively correlated with DEBQ score (r= -0.361, p=0.00). MBSRQ and DEBQ score was lower in who had meal skipped or not received diet trehapy but the differences were not statistically significant (Table 3).

Table 3. Correlation between body image perception, eating behaviors, nutritional status and some characteristics

	MBSRQ score		DEBQ score	
	r	p	r	p
Characteristics				
Age	-0.279	0.01*	-0.125	0.26
Training (day/week)	0.059	0.60	0.108	0.34
Training (hours/day)	0.066	0.56	0.052	0.64
BMI, (kg/m^2)	-0.016	0.14	-0.008	0.94
Waist curcimference, (cm)	-0.010	0.35	-0.020	0.98
Wasit to hip ratio, (cm)	-0.006	0.95	-0.103	0.36
Classification of sports	0.098	0.38	0.017	0.88
Eating habits				
Number of main meals	-0.019	0.86	-0.361*	0.00
Number of snacks	0.129	0.25	0.093	0.41
Skipping meals[#]	-0.009	0.93	-0.062	0.58
Diet treatment[#]	0.009	0.93	0.088	0.43
Nutritional status				
Total energy (kcal/day)	-0.129	0.25	-0.235	0.04*
Carbohydrate (TE %)	-0.211	0.06	0.087	0.44
Protein (TE %)	0.282	0.01*	0.049	0.66
Total fat (TE %)	0.135	0.23	0.052	0.64
Saturated fatty acid (%)	0.023	0.75	0.075	0.29
Monounsaturated fatty acid (%)	0.030	0.68	0.078	0.27
Polyunsaturated fatty acid (%)	0.014	0.85	0.065	0.36
Fiber (g)	0.024	0.83	0.053	0.45
Vitamin A (µg/RE)	0.118	0.09	0.005	0.94
Vitamin E (mg)	0.017	0.81	0.058	0.41
Thiamine (mg)	0.005	0.94	0.096	0.18
Riboflavin (mg)	0.044	0.54	0.015	0.83
Niacin (mg)	0.027	0.71	0.065	0.36
Folate (mcg)	0.062	0.39	0.105	0.14
Vitamin B$_6$ (mg)	0.184	0.01*	0.130	0.07
Vitamin B$_{12}$ (mcg)	0.173	0.01*	0.044	0.54
Vitamin C (mg)	0.032	0.65	0.078	0.27
Calcium (mg)	0.189	0.01*	0.036	0.61
Magnesium (mg)	0.078	0.27	0.045	0.52
Iron (mg)	0.210	0.01*	0.055	0.44

We analyzed the nutritional status of the athletes and MBSRQ score was negatively correlated with energy and carbohydrate (TE%), but only MBSRQ score was positively correlated with protein intake (TE%) ($r=0.282$, $p=0.01$). Only, MBSRQ score was positively correlated with vitamin B_6 ($r=184$, $p=0.01$), vitamin B_{12} ($r=0.173$, $p=0.01$), calcium ($r=0.189$, $p=0.01$) and iron ($r=0.210$, $p=0.01$) intake. Similarly, a positive correlation was found between DEBQ score and all macro-micro nutrient but these correlations were not statistically significant. Only, DEBQ score was negatively correlated with total energy intake ($r=-0.235$, $p=0.04$) (Table 3).

Discussion

This study demonstrated that 70.0% of the female athletes had skipped meal. Also, female athletes had a normal BMI but 65.0% of them indicated that want to be thinner. On the other hand, we analyzed that their daily nutrients intake, so we observed that 43.4% of the energy was from the fatty acids, especially saturated fatty acids, and they had lower fiber, calcium and iron intake. The studies about nutrition status among athletes show that daily low energy intake, a combination of percentage calories from carbohydrate less than 50%, protein greater than 20% and fat greater than 30% of total energy. For example, Zapolska et al. found that the percentage of daily calories intake was 45.9% from carbohydrate, 21.3% from protein and 32.8% from fat among female professional volleyball players in Poland (Zapolska, Witczak, Manczuk &Ostrowska, 2014).

Similirlay, Chung, Siu & Chan (2012) indicated that that the percentage of daily calories intake was 51.0% from carbohydrate, 16.0% from protein and 32.0% from fat in both gender among elite athletes in Hong Kong. Some studies have shown that micronutrient intake was below the recommendations in athletes. For example lower calcium, folate, zinc, iron, vitamin A, vitamin C intake was observed in female athletes such as female volley ball players, national female soccer players, female elite aquatic athlete, female national level rhythmic gymnasts, professional weightlifters exc (Hima Bindu Malla, Dhingra & Lal, 2017).

Eating behavior of athletes is affected by various stimuli present in their environment. Attitudes play an important role in the adoption and maintenance of a variety of health and nutritional habits. Especially studies have shown that athletes are more prone to developing eating disorders (Kong & Harris, 2015; Churchill, 2014). Among athletes, the prevalence of eating disorders was 23-25% and disordered eating was 15-62% (Joy, Kussman & Nattiv, 2016). There is strong and consistent evidence that eating disorders are prevalent in weight sensitive sports and higher in females than in males (Currie, 2010). In this study we found that

the atheletes had a normal BMI but 65.0% of them indicated that want to be thinner. Additionaly, the mean DEBQ score for athletes was 91.3 ± 24.49. The minimum and maximum scores obtained from the DEBQ was 33,165, respectively and higher scores indicating greater endorsement of the eating behavior. So, firstly we found that BMI, waist circumference, waist to hip ratio were negatively correlated with DEBQ score and it was lower in who had meal skipped or not received diet trehapy. In addition total energy intake and the main meals number were negatively correlated with DEBQ score.

Additionally, body image perception, negative perfectionism and social physique anxiety influence disordered eating and eating disorders in elite athletes (Kong & Harris, 2015). Body image dissatisfaction trigger factors associated with the onset of were prolonged periods of dieting, frequent weight fluctuations, the sudden increase in training volume and traumatic events such as injury (Kosteli, Van Raalte, Brewer & Cornelius, 2014). Accordingly, we assessed body image perception among athletes and we used to MBSRQ. So, in this study, we found that BMI, waist circumference, waist to hip ratio were negatively correlated with MBSRQ score and it was lower in who had meal skipped or not received diet therapy. Also we found that MBSRQ score was positively relationship with many micro nutrient intake especially vitamin B_6 , vitamin B_{12} , calcium and iron ($p<0.05$).

Conclusions

As a conclusion, the results of the current study may help to determine the knowledge about the body image perceptions and eating behavior among female athletes in Ankara, Turkey. Firstly, coaches, parents or others should focus on highlighting the importance of healthy body image to prevent the sprouting of the seed of doubt regarding their body. Secondly, nutrition education is needed to improve nutrition knowledge and bring changes in dietary practices. Nutrition-education programs are often based on the premise that superior nutrition knowledge may translate into the better dietary intake. Nutrition education is frequently neglected in sports programs. There is a paucity of nutrition education interventions among different sports. More studies are needed to be done in this area & provide right information & encourage athletes to bring healthy changes in their diet.

Disclosure statement

No potential conflict of interest was reported by the authors.

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