



# Preliminary Finding: Survey on Eating Disorder and Nutritional Status among Young Athletes

**Wong CPF\* and Sinpong HH**

Nutrition Programme, Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, Malaysia

**\*Corresponding author:** Chee Ping Fadzel Wong, Nutrition Programme, Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, Jalan UMS, 88400, Kota Kinabalu, Sabah, Email: fadzel@ums.edu.my

## Research Article

Volume 5 Issue 4

Received Date: December 03, 2021

Published Date: December 28, 2021

DOI: 10.23880/jonam-16000333

## Abstract

**Introduction:** It is well documented that eating disorders will have a negative impact on health status and athletic performance. The risks of eating disorders among athletes are required to be detected early before it affects athlete's health and exercise performance. To date, there is still scanty information on eating disorder and nutritional status among young athletes in Sabah.

**Objective:** The objective of this study was to determine eating disorders and nutritional status among young athletes in Sabah.

**Methodology:** A total of 55 young athletes who are active representatives of sports competitions were selected to participate in this study. Eating attitudes test questionnaires (EAT-26) was used to determine eating disorder risk. International physical activity questionnaire (IPAQ) and 3-days food diary were used to determine nutritional status and physical activity level. Statistical Package for the Social Sciences (SPSS) version 27.0 was used to analyse the collected data. Pair-t test was used to compare energy intake of subjects with the recommended nutrient intake for Malaysia (PAL2.0). The significant level is  $p < 0.05$ .

**Results:** This study found that aesthetic and weight category sports were the highest risk for eating disorder. Energy intake (kcal/day) in the aesthetic, weight category, endurance and ball games did not significantly meet the daily energy intake recommendations.

**Conclusion:** As a conclusion, majority of the subjects did not practicing balanced diet and meet the recommended nutrient intake (RNI) especially in the aesthetic and weight category sports. These current findings are useful to detect early eating disorder among young athletes before it become critical and affect athletes' exercise performance and health status.

**Keywords:** Eating Disorder; Athletes; Aesthetic Sports; Energy Intake; Physical Activity; EAT-26

**Abbreviations:** EAT-26: Eating Attitude Test; IPAQ: Physical Activity Questionnaire; RNI: Recommended Nutrient Intake; IPAQ: International Physical Activity Questionnaire; SPSS: Statistical Package For The Social Sciences; MET: Metabolic Equivalent of Task

## Introduction

Eating disorders are psychological illnesses characterized by severe and persistent eating behavior disorders. Eating disorders are serious mental illnesses with high mortality

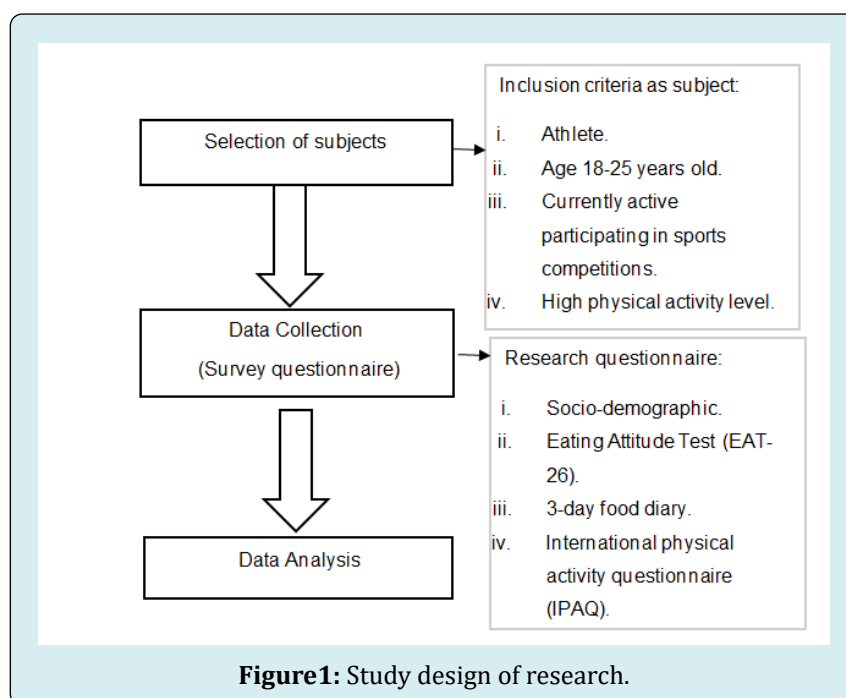
rates [1,2] and it can affect any individual regardless of age, race, ethnicity and gender [3]. Previous studies found that an athlete has a high risk for eating disorders compared to a non-athlete [4,5]. It is well documented that eating disorders have a significant negative impact on health status [6-10] and athletic performance [11-13]. Many previous studies reported that female athletes have a higher risk of eating disorders in comparison with male athletes [14-20]. Female athletes are more concerned with weight and thin appearance that cause female athletes have a higher eating disorder risk compare to male athletes that are more concerned with muscle mass and strength [4].

Nutritional status assessment is an effective strategic to detect eating disorders risk among athletes [21]. Therefore, nutritional status assessment can assess a person's health and help to identify individuals at eating disorder risk. Generally, athletes required a higher energy and nutritional requirements compared to a non-athlete [22-23]. To date, there is still scanty information on eating disorder among

young athletes in different categories of sports in Sabah. This study was designed to investigate eating disorders and nutritional status among young athletes in the sports ball, aesthetic, endurance and weigh category sports. The findings of this current research are useful to detect early eating disorder and nutritional problems faced by athletes before it become critical and affect athletes' health and exercise performance.

## Methodology

Fifty five Sabahan young athletes who met the inclusion criteria as subjects were recruited in this study. This study was conducted online with the use of a survey questionnaire. The questionnaire used in this study consists of four sections which were socio demographics, Eating Attitude Test (EAT-26), 3-day food diary and International Physical Activity Questionnaire (IPAQ). The study design is shown in the Figure 1.



EAT-26 questionnaire was used to measure the level of eating disorders risk. EAT-26 consists of 26 questions and has six scales options ('always', 'usually', 'often', 'sometimes', 'rarely' or 'never'). Questions were divided into three subscales: (a) diet; (b) bulimia and attention towards food; and (c) self-control. There were five behavioral questions. Four questions related to overeating, vomiting, use of laxatives, and exercise as a method of weight control. The questions have six scales options ('never', 'once a month or less', '2-3 times a month', 'once a week', '2-6 times a week', 'once a day or more'). There was one question related to

weight loss and this question has two answer choices ('yes', 'no'). Table 1 is the classification of scores for eating disorders risk.

Score	Classification
≥20	High (+)
<20	Low/ normal (-)

**Table 1:** Classification of eating disorders risk score (EAT-26).

Subjects recorded all foods and beverages consumed for three days (two weekdays and one weekend) in a 3-day food diary form [21,24,25]. Food quantities were estimated using household measures [24]. The food intake was analyzed using the food composition dietary plus software [26]. International physical activity questionnaire (IPAQ) was used to determine physical activity level of the subjects. The questionnaire was self-reported by the respondents and there were seven question items. The item requires respondents to report the type of activities performed during a week, duration and frequency of each activity. The questionnaire provided information on time spent for walking, doing vigorous and moderate intensity activities as well as sedentary activities. The duration of each activity will be multiplied by the metabolic equivalent of task (MET) value for each activity (MET-min/week). Physical activity level

calculation analysis was performed using IPAQ short form scoring software and excel spreadsheet. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 28.0. Pair-t test was used to compare energy intake with the recommended nutrient intake for Malaysia (PAL2.0). All data is presented in mean  $\pm$  standard deviation. The significant level is  $p < 0.05$ .

## Results and Discussion

A total of 55 young athletes were recruited in this study. The data demographic of subjects are shown in the Table 2. There has 22 subjects (ball game sports), 17 subjects (endurance sports) and 16 subjects (aesthetic and weight sports) participated in this research. Majority subjects were representing university level in the sports competition.

Characteristics	Total (n=55)	Male (n=28)	Female (n=27)
	Frequency (%)		
Race			
Malay	11 (20)	7 (25)	4 (14.8)
Kadazan Dusun	22 (40)	8 (28.6)	14 (51.9)
Murut	9 (16.4)	5 (17.9)	4 (14.8)
Chinese	4 (7.3)	2 (7.1)	2 (7.4)
Others	9 (16.3)	6 (21.4)	3 (11.1)
Type of sport			
Ball game sports	22 (40)	11 (39.3)	11 (40.7)
Endurance sports	17 (30.9)	10 (35.7)	7 (25.9)
Aesthetic and weight category sports	16 (29.1)	7 (25)	9 (33.4)
Level of involvement			
College / University	18 (32.7)	6 (21.4)	12 (44.4)
District	6 (10.9)	2 (7.1)	4 (14.8)
State	8 (14.5)	7 (25)	1 (3.7)
National	12 (21.8)	6 (21.4)	6 (22.3)
International	5 (9.2)	3 (10.8)	2 (7.4)
Others	6 (10.9)	4 (14.3)	2 (7.4)

**Table 2:** Data demography of subjects.

Data are expressed in frequency (percentage)

### Energy Intake and Physical Activity Level of Subjects

Mean physical activity (MET-min/week) of subjects is shown in the Table 3. All subjects have high physical activity according to the international physical activity questionnaire scoring. High physical activity level is defined as any one of the following two criteria; Vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/

week or 7 or more days of any combination of walking, moderate- or vigorous- intensity activities accumulating at least 3000 MET-minutes/week. This finding was met the inclusion criterion as subject which only selected subjects who have high physical activity level. Mean energy intake (kcal/day) of subjects is presented in the Table 4. There was a significant differences between daily energy intake and recommended nutrient intake for Malaysia (PAL2.0) in all sports category ( $p < 0.05$ ).

	Male	Female	Total
	Mean $\pm$ SD	Mean $\pm$ SD	Min $\pm$ SD
Age (year)	23.9 $\pm$ 3.1	23.6 $\pm$ 2.4	23.8 $\pm$ 2.8
Physical activity (MET-min/ week)	3698.3 $\pm$ 1510.7	3214.6 $\pm$ 1241.2	3460.8 $\pm$ 1393.7

**Table 3:** Physical activity level of subjects (MET-min/week).  
Data are expressed in mean  $\pm$  S.D

	Male				Female				Total (n=55)
	Ball game sports (n=11)	Endurance sports (n=10)	Aesthetic & weight category sports (n=7)	Total (n=28)	Ball game sports (n=11)	Endurance sports (n=7)	Aesthetic & weight category sports (n=9)	Total (n=27)	
	Mean $\pm$ SD				Mean $\pm$ SD				Mean $\pm$ SD
Energy intake (kcal/ day)	1785.2 $\pm$ 271.2	1664.6 $\pm$ 300.8	1687.5 $\pm$ 269.3	1717.7 $\pm$ 276.8	1260.7 $\pm$ 264.9	1410.3 $\pm$ 310.2	1322.3 $\pm$ 136.5	1320.1 $\pm$ 242.1	1522.5 $\pm$ 326.8
Carbohydrate (g/ day)	216.6 $\pm$ 37.4	198.9 $\pm$ 43.2	198.1 $\pm$ 29.3	205.6 $\pm$ 37.6	160.1 $\pm$ 37.3	178.8 $\pm$ 31.9	149.4 $\pm$ 25.9	161.4 $\pm$ 33.3	183.9 $\pm$ 41.7
Protein (g/ day)	82.2 $\pm$ 13.5	81.7 $\pm$ 14.5	86.5 $\pm$ 21.9	83.1 $\pm$ 15.8	59.5 $\pm$ 15.1	60.1 $\pm$ 16.7	67.2 $\pm$ 16.8	62.2 $\pm$ 15.9	72.9 $\pm$ 18.9
Fat (g/ day)	65.5 $\pm$ 13.1	60.2 $\pm$ 17.8	61.5 $\pm$ 17.9	62.6 $\pm$ 15.7	42.8 $\pm$ 10.6	50.7 $\pm$ 15.6	50.2 $\pm$ 8.6	47.3 $\pm$ 11.7	55.1 $\pm$ 15.8
Carbohydrate (%)	48.5 $\pm$ 3.2	47.9 $\pm$ 6.6	47.4 $\pm$ 6.1	47.9 $\pm$ 5.2	50.8 $\pm$ 6.3	51.1 $\pm$ 3.9	45.4 $\pm$ 7.4	49.1 $\pm$ 6.5	48.5 $\pm$ 5.8
Protein (%)	18.5 $\pm$ 2.3	19.7 $\pm$ 1.9	20.4 $\pm$ 3.1	19.4 $\pm$ 2.5	18.9 $\pm$ 3.3	16.9 $\pm$ 1.9	20.2 $\pm$ 4.1	18.8 $\pm$ 3.4	19.1 $\pm$ 2.9
Fat (%)	32.9 $\pm$ 3.7	32.4 $\pm$ 5.9	32.4 $\pm$ 6.5	32.6 $\pm$ 5.1	30.5 $\pm$ 3.9	32.1 $\pm$ 4.8	34.1 $\pm$ 4.5	32.1 $\pm$ 4.5	32.4 $\pm$ 4.8

**Table 4:** Energy intake (kcal/day) of subjects.  
Data are expressed in mean  $\pm$  S.D

Mean energy intake for male (1717.7  $\pm$  276.8 kcal/ day) and female (1320.1  $\pm$  242.1 kcal/ day) athletes did not achieve the recommended energy in take based on Recommended Nutrient Intake for Malaysia (RNI) (PAL 2.0); males (2800 kcal/day) and females (2210 kcal/day) aged 18-29 years old. These findings reflected that majority athletes did not practicing a balanced diet. Previous studies also found similar findings reported that mean daily energy intake of athletes was less and did not achieve the recommended daily energy intake [22,27-30]. There are various possibilities that contribute to a low energy intake which did not meet the recommendations among athletes. It may be due to the athletes tend to engage in unhealthy dietary behaviors such as limiting food intake, use of diet pills or diuretics to control their body weight [22,24,31]. It may also be due to the lack of nutritional knowledge among athletes and sports coaches on how to lose weight in an accurate method [32].

### Eating Disorder of Subjects

Eating disorder scoring of subjects (EAT-26) is shown in Table 5. There are 36.4% (n= 20) of athletes have a high risk of eating disorders based on the EAT-26 scoring. For male athletes, aesthetic and weight category sports contributed to the highest risk of eating disorders (n= 6) followed by ball games sports (n=3) and endurance sports (n=2). Similarly finding also noticed in the female athletes, aesthetic and weight category sports were the highest risk of eating disorders (n=5) and it was followed by endurance sports (n=4). These current findings were agreement with the previous studies also reported that athletes involved in the aesthetic sports (gymnastics) and weight categories such as taekwondo, judo, weightlifting and wrestling have a higher risk of eating disorders compared to the other types of sports [20,31,33,34]. Aesthetic sports are concerned with

low weight and attractive appearance to meet the specific criteria of the sports [6,18]. Weight categories sports is required to keep their body weight in the appropriate range to eligible to participate in certain weight category sports competition [33,26-36]. Therefore, aesthetic and weight category sports are required to maintain their body weight and it has a high risk of eating disorder.

Majority of subjects reported binge eating behaviors and practicing exercise strategies to control weight. The percentage of binge eating behaviors reported in the male athletes was 71.3% while female athletes were 66.7%. The

percentages of practicing exercise strategies to control body weight in male athletes were 93% and female athletes were 92.6%. These findings were consistent with previous studies also found that athletes tend to engage in binge eating behaviors and extreme exercise to control their body weight [4,31,37]. Binge eating behavior was reported significantly negative effect on health condition, dental complications, electrolyte imbalances and dehydration [35,38]. Therefore, nutrition education play an important role to guide an athlete to has an accurate method to lose weight without any negative effect on health condition and athletic performance.

	Male				Female				Total
	Ball game sports (n=11)	Endurance sports (n=10)	Aesthetic & weight category sports (n=7)	Total (n=28)	Ball game sports (n=11)	Endurance sports (n=7)	Aesthetic & weight category sports (n=9)	Total (n=27)	Total (n=55)
	Frequency (%)				Frequency (%)				Frequency (%)
<20	8 (28.6)	8 (28.6)	1 (3.6)	17 (60.8)	11 (40.8)	3 (11.1)	4 (14.8)	18 (66.7)	35 (63.6)
≥20	3 (10.7)	2 (7.1)	6 (21.4)	11 (39.2)	0 (0)	4 (14.8)	5 (18.5)	9 (33.3)	20 (36.4)
Gone on eating binges where you feel that you may not be able to stop?									
Never	2 (7.2)	5 (17.9)	1 (3.6)	8 (28.7)	1 (3.7)	2 (7.4)	6 (22.2)	9 (33.3)	17 (30.9)
Once a month/ <	2 (7.1)	2 (7.1)	2 (7.1)	6 (21.3)	6 (22.2)	2 (7.4)	1 (3.7)	9 (33.3)	15 (27.3)
2-3 times/ month	5 (17.8)	0 (0)	1 (3.6)	6 (21.4)	1 (3.7)	2 (7.4)	2 (7.4)	5 (18.5)	11 (20)
Once a week	1 (3.6)	1 (3.6)	1 (3.6)	3 (10.8)	3 (11.1)	0 (0)	0 (0)	3 (11.1)	6 (10.9)
2-6 times/ month	1 (3.5)	0 (0)	2 (7.1)	3 (10.6)	0 (0)	1 (3.7)	0 (0)	1 (3.7)	4 (7.3)
Once a day/ >	0 (0)	2 (7.1)	0 (0)	2 (7.1)	0 (0)	0 (0)	0 (0)	0 (0)	2 (3.6)
Ever made you sick (vomited) to control your weight or shape?									
Never	8 (28.6)	8 (28.6)	3 (10.7)	19 (67.9)	10 (37.0)	7 (25.9)	4 (14.8)	21 (77.7)	40 (72.7)
Once a month/ <	1 (3.6)	0 (0)	2 (7.2)	3 (10.8)	0 (0)	0 (0)	4 (14.8)	4 (14.8)	7 (12.7)
2-3 times/ month	1 (3.5)	0 (0)	1 (3.5)	2 (7.0)	1 (3.75)	0 (0)	1 (3.75)	2 (7.5)	4 (7.3)
Once a week	1 (3.55)	1 (3.55)	0 (0)	2 (7.1)	0 (0)	0 (0)	0 (0)	0 (0)	2 (3.6)
2-6 times/ month	0 (0)	1 (3.6)	0 (0)	1 (3.6)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1.8)
Once a day/ >	0 (0)	0 (0)	1 (3.6)	1 (3.6)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1.8)
Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?									

Never	11 (39.3)	10 (35.7)	5 (17.9)	26 (92.9)	9 (33.4)	7 (25.9)	8 (29.6)	24 (88.9)	50 (90.9)
Once a month/ <	0 (0)	0 (0)	0 (0)	0 (0)	1 (3.7)	0 (0)	0 (0)	1 (3.7)	1 (1.8)
2-3 times/ month	0 (0)	0 (0)	1 (3.6)	1 (3.6)	1 (3.7)	0 (0)	0 (0)	1 (3.7)	2 (3.6)
Once a week	0 (0)	0 (0)	1 (3.6)	1 (3.6)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1.8)
2-6 times/ month	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (3.7)	1 (3.7)	1 (1.8)
Once a day/ >	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Exercised more than 60 minutes a day to lose or to control your weight?									
Never	1 (3.5)	1 (3.5)	0 (0)	2 (7.0)	0 (0)	1 (3.7)	1 (3.7)	2 (7.4)	4 (7.3)
Once a month/ <	0 (0)	0 (0)	0 (0)	0 (0)	2 (7.4)	0 (0)	2 (7.4)	4 (14.8)	4 (7.3)
2-3 times/ month	3 (10.8)	1 (3.6)	0 (0)	4 (14.4)	7 (25.9)	3 (11.1)	1 (3.7)	11 (40.7)	15 (27.3)
Once a week	0 (0)	0 (0)	2 (7.1)	2 (7.1)	1 (3.7)	1 (3.7)	0 (0)	2 (7.4)	4 (7.3)
2-6 times/ month	7 (25)	3 (10.7)	4 (14.3)	14 (50.0)	1 (3.7)	2 (7.4)	2 (7.4)	5 (18.5)	19 (34.5)
Once a day/ >	0 (0)	5 (17.8)	1 (3.6)	6 (21.4)	0 (0)	0 (0)	3 (11.1)	3 (11.1)	9 (16.4)
Lost 20 pounds or more in the past 6 months.									
Yes	1 (3.5)	0 (0)	1 (3.5)	2 (7.0)	2 (7.4)	0 (0)	1 (3.7)	3 (11.1)	5 (9.1)
No	10 (35.8)	10 (35.8)	6 (21.4)	26 (93.0)	9 (33.3)	7 (26.0)	8 (29.6)	24 (88.9)	50 (90.9)

**Table 5:** Eating disorder scoring of subjects (EAT-26).

## Conclusion

As a conclusion, athletes from aesthetic and weight category sports were the highest risk of eating disorders. Energy intake (kcal/day) of athletes did not meet the daily recommended nutrient intake for Malaysia (PAL2.0). It reflected that athletes did not practicing a healthy and balanced diet. These recent finding showed a clear message that athletes are required to increase their nutrition knowledge on a balanced diet to reduce the risk of eating disorders. It is well documented that eating disorders will have a negative impact on health status and athletic performance. Furthermore, more studies are still warranted to investigate eating disorder among young athletes in a large sample size population. These findings are useful to detect early eating disorder among young athletes before it become critical and affect athletes' exercise performance and health status.

## References

1. Smink FR, Van Hoeken DV, Hoek HW (2012) Epidemiology of eating disorders: incidence, prevalence, and mortality rates. *Curr Psychiatry Rep* 14(4): 406-414.
2. Fichter MM, Quadflieg N (2016) Mortality in eating disorders-results of a large prospective clinical longitudinal study. *Int J Eat Disord* 49(4): 391-401.
3. Ambrose M, Deisler V (2014) *Eating Disorders: Examining Anorexia, Bulimia and Binge Eating*. Enslow Publishing, USA.
4. DiPasquale LD, Petrie TA (2013) Prevalence of disordered eating: A comparison of male and female collegiate athletes and nonathletes. *Journal of Clinical Sport Psychology* 7(3): 186-197.
5. Blair L, Aloia CR, Valliant MW, Knight KB, Garner JC, et al.



- (2017) Association between athletic participation and the risk of eating disorder and body dissatisfaction in college students. *Int J Health Sci* 11(4): 8-12.
6. Currie A, Crosland J (2009) Responding to eating disorders in sport-UK guidelines. *Nutrition & Food Science* 39(6): 619-626.
  7. Sanborn CF, Horea M, Siemers BJ, Dieringer KI (2000) Disordered eating and the female athlete triad. *Clin Sports Med* 19(2): 199-213.
  8. Melin A, Tomberg AB, Skouby S, Moller SS, Borgen JS, et al. (2015) Energy availability and the athlete triad in elite endurance athletes. *Scand J Med Sci Sports* 25(5): 610-622.
  9. Mehler PS, Andersen AE (2017) *Eating disorders: A guide to medical care and complications*. Johns Hopkins University Press, USA.
  10. Thompson RA, Sherman R (2014) Reflections on athletes and eating disorders. *Psychology of Sport and Exercise* 15(6): 729-734.
  11. Beals KA (2004) *Disordered eating among athletes: A comprehensive guide for health professionals*. Human Kinetics, USA, PP: 255.
  12. Oliveira GLD, Oliveira TAPD, Gonçalves PSDP, Silva JRV, Fernandes PR, et al. (2017) Body Image and Eating Disorders in Female Athletes of Different Sports. *Journal of Exercise Physiology* 20(2): 45-54.
  13. Ghoch ME, Soave F, Calugi S, Grave RD (2013) Eating disorders, physical fitness, and sport performance: A systematic review. *Nutrients* 5(12): 5140-5160.
  14. Martinsen M, Sanda SB, Eriksson AK, Borgen JS (2010) Dieting to win or to be thin? A study of dieting and disordered eating among adolescent elite athletes and non-athlete controls. *Br J Sports Med* 44(1): 70-76.
  15. Martinsen M, Borgen JS (2013) Higher prevalence of eating disorders among adolescent elite athletes than controls. *Med Sci Sports Exerc* 45(6): 1188-1197.
  16. Fortes LDS, Kakeshita IS, Almeida SS, Gomes AR, Ferreira MEC (2014) Eating behaviours in youths: A comparison between female and male athletes and non-athletes. *Scand J Med Sci Sports* 24(1): 62-68.
  17. Ismailova D, Gazdowska Z (2016) Eating disorders in sport: Review of prevalence, risk factors, and studies of eating disorders in highly competing athletes. *Journal of Education, Health and Sport* 6(6): 351-358.
  18. Joy E, Kussman A, Nattiv A (2016) Update on eating disorders in athletes: A comprehensive narrative review with a focus on clinical assessment and management. *Br J Sports Med* 50(3): 154-162.
  19. Krebs PA, Dennison CR, Kellar L, Lucas J (2019) Gender differences in eating disorder risk among NCAA division I cross country and track student-athletes. *J Sports Med* pp: 5035871.
  20. Batlle CT, Ventura C, Andres A (2021) Eating Disorder Symptoms in Elite Spanish Athletes: Prevalence and Sport-Specific Weight Pressures. *Front Psychol* 11: 559832.
  21. Meyer DEL, Woolf K, Burke L (2018) Assessment of nutrient status in athletes and the need for supplementation. *Int J Sport Nutr Exerc Metab* 28(2): 139-158.
  22. Hinton PS, Sanford TC, Davidson MM, Yakushko OF, Beck NC (2004) Nutrient intakes and dietary behaviors of male and female collegiate athletes. *Int J Sport Nutr Exerc Metab* 14(4): 389-405.
  23. Volpe SL (2007) Micronutrient requirements for athletes. *Clin Sports Med* 26(1): 119-130.
  24. Papandreou D, Eystathiadis P, Bouzoukiu V, Hassapidou M, Tsitskaris, et al. (2007) Dietary assessment, anthropometric measurements and nutritional status of Greek professional athletes. *Nutrition & Food Science* 37(5): 338-344.
  25. Driskell JA, Wolinsky I (2011) *Nutritional assessment of athletes 2<sup>nd</sup> (Edn.)*, Boca Raton, CRC press, USA.
  26. Ng TKW (2010) DietPLUS-a user-friendly "2 in 1" food composition database and calculator of nutrient intakes. *Malays J Nutr* 16(1): 125-130.
  27. Suman D, Sharma AK (2013) A Study of Dietary Profile of North and South Indian Hockey Players. *Int J Management, Economics and Social Sciences* 2(2): 93-95.
  28. Zapolska J, Witczak K, Manczuk A, Ostrowska L (2014) Assessment of nutrition, supplementation, and body composition parameters on the example of professional volleyball players. *Rocz Państw Zakł Hig* 65(3): 235-242.
  29. Santos DD, Silveira JQD, Cesar TB (2016) Nutritional intake and overall diet quality of female soccer players before the competition period. *Revista de Nutricao* 29(4): 555-565.
  30. Baranauskas M, Stukas R, Tubelis L, Zagminas K,

- Surkiene G, et al. (2015) Nutritional habits among high-performance endurance athletes. *Medicina* 51(6): 351-362.
31. Chatterton JM, Petrie TA (2013) Prevalence of disordered eating and pathogenic weight control behaviors among male collegiate athletes. *Eat Disord* 21(4): 328-341.
  32. Syihab SF, Astuti W, Sentani MR, Kumalasari I (2020) Nutritional Status Assessment of West Java Athletes: A Preliminary Studies. *Journal of Applied Food and Nutrition* 1(1): 32-39.
  33. Borgen JS, Torstveit MK (2004) Prevalence of eating disorders in elite athletes is higher than in the general population. *Clin J Sport Med* 14(1): 25-32.
  34. Thiemann P, Legenbauer T, Vocks S, Platen P, Auyeung B, et al. (2015) Eating disorders and their putative risk factors among female German professional athletes. *Eur Eat Disord Rev* 23(4): 269-276.
  35. Bonci L (2009) Sports nutrition for coaches. Human Kinetics Publishers, USA.
  36. Byrne S, McLean N (2001) Eating disorders in athletes: a review of the literature. *J Sci Med Sport* 4(2): 145-159.
  37. Petrie TA, Christy G, Justine R, Jennifer C (2008) Prevalence of eating disorders and disordered eating behaviors among male collegiate athletes. *Psychol Men Masc* 9(4): 267-77.
  38. Mehler PS, Birmingham LC, Crow SJ, Jahraus JP (2010) Medical complications of eating disorders. In: Grilo CM, Mitchell JE (Eds.), *The treatment of eating disorders: A clinical handbook*. The Guilford Press, pp: 66-80.

