Original

Influencia de la adherencia a la dieta mediterránea baja en grasas en el rendimiento en jóvenes regatistas de élite

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Resumen

Fundamentos: En las regatas de vela hay muchos factores que pueden afectar al rendimiento del regatista. Entre estos se encuentran la experiencia, el entrenamiento o la dieta. El objetivo de este estudio fue analizar si existen asociaciones entre la adherencia a la dieta mediterránea baja en grasas (ADMBG) y la edad, el número de entrenamientos, la experiencia y el tipo de bote en regatistas jóvenes; así como estudiar las diferencias entre una alta o baja adherencia DMBG y alto o bajo IMC sobre las variables indicadas.
Métodos: 75 regatistas rellenaron un cuestionario sobre datos socio-demográficos, deportivos, y el cuestionario PREDIMED sobre ADMBG. El peso y la estatura fueron medidos mediante bioimpedancia eléctrica y tallímetro.
Resultados: se encontraron diferencias estadísticamente significativas (p=0.045), para el IMC entre regatistas con alta y baja ADMBG. En cuanto a la comparación entre grupos con diferentes rangos de IMC, se observaron diferencias entre regatistas con más experiencia mostraron un mayor IMC (p=0.004), también obtuvieron mayor IMC los que mejor posición en ocupaban en el ranking (p=0.026).
Conclusiones: los regatistas con mayor ADMBG, más experiencia y mayor nivel, mostraron un mayor IMC.

Palabras clave: Composición corporal; valoración nutricional; ejercicio; embarcaciones.

Influence of low fat Mediterranean diet adherence in young elite sailors' performance

Summary

Background: In the sailing races (regattas) there are many factors that can affect the performance of the sailor, like his experience, training or diet. The objective of this study was to analyze if there exists associations between adherence to a low fat Mediterranean diet (LFMDA) and conditions such as: the age, number of trainings, experience and type of boat in young sailors. As well as studying the differences between a high or low adhesion to the LFMDA and a high or low BMI on specified variables.
Methods: 75 sailors contributed their sporting, socio-demographic data, and filled out the PREDIMED questionnaire on LFMD. Their weight and height were measured using electrical bioimpedance and a professional medical scale.
Results: statistically significant differences were found on the BMI (p = 0.045) among sailors with high and low adherence to a LFMDA. As for the comparison between groups with different ranges of BMI, differences between sailors with more experience showed a major BMI (p = 0.004), also the sailors that occupied better positions in the ranking obtained greater BMI (p = 0.026).
Conclusions: the sailors adhering better to the LFMDA, with more experience and higher level of performance, showed a greater IMC.

Key words: Body composition; Nutrition assessment; Exercise; Ships.

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Background

Sailing performance can be influenced by many factors, such as wind or sea conditions, in addition to competitors' behaviors and physical characteristics[1–3]. A lot of aspects may affect competitive performance in sailing, and many researchers have investigated about them. In this sense, experience and number of trainings per week could influence on tactical intelligence and sailing technique. Also the different boat classes require different physical, psychological and cognitive demands for sailors to improve their performance[4]. Furthermore, physical fitness and nutrition are predictable variables to adjust sailor performance that can modify it constantly, trying to create the most appropriate conditions.

A Mediterranean diet, as well as healthy eating habits, highly contribute to benefit health status and to achieve quality of life[5]. The last meta-analysis of Mediterranean diet[6]showed its importance to reduce risk and incidence of severe diseases (cardiovascular, cancer, Parkinson, Alzheimer...) and it also proved to prevent chronic diseases. Furthermore, it has been shown that Mediterranean diet has been associated to lower prevalence of obesity. Mediterranean diet adherence seems to not improve sport performance and body composition[7,8]. Nevertheless, a recent study about body composition and Mediterranean diet adherence among young Mediterranean boys and girls concluded that it is associated to Body Mass Index (BMI) and body composition[9].

The hypothesis of this study is that Low Fat Mediterranean Diet Adherence (LFMDA) could be influenced by sex, age, number of trainings per week, years of experience, ranking on the competitions and type of boat, and also affect the BMI and sailing performance. Doubling the number of physical education classes will improve physical fitness in adolescents. The confirmation of the hypothesis could have important public health implications.

The main purpose of this study was to describe main characteristics of elite young sailors with high and low LFMDA, as well as comparing their measurements (the sailors were separated by gender). Performed the comparison of LFMDA and BMI related to sex, age, number of trainings per week, years of experience, ranking and type of boat. To establish associations between LFMDA with the rest of the variables that could influence on sailing performance.

Material y methods

Participants

In this study participated 75 young elite sailors (50 males, 25 females between 15.7 ± 1.8 years old) from Valencian Community and Region of Murcia (random sample by conglomerates). Sailors participated in three different boat classes of 2 days of regatta with 6 races on a competition in Spain ("Gran Trofeo de Valencia") in 2017. Respecting Helsinki Declaration, this research was approved by the Ethics Committee of the Catholic University of San Antonio of Murcia, and all the participants gave their consent to participate in the research as well as their parents or legal guardians.

Instruments

Socio-demographic and training data was collected by standardized questionnaires (data: age, sex, boat class, experience, number of trainings per week, and ranking position, such a principal performance variable) before starting the competition.

To measure LFMDA in sailors, PREDIMED[10] inventory was used. There are nine questions in LFMDA questionnaire about food habits related to fat intake (High LFMDA: ≥6 points;

Low LFMDA: <6 points). The highest score is nine points, and it corresponds to high low fat diet adherence. Cronbach´s alpha (CA) to measure internal validity and consistency of the PREDIMED LFMDA questionnaire showed CA=0.78.

Based on International Society for the Advancement of Kinanthropometry guideliness[11] total body weight was measured[12] using Tanita BC-418 MA (Tanita Corporation, Arlington Heights, IL) to the nearest 0.1 kg. Standing height was measured using a Seca 202 stadiometer (Seca, Hamburg, Germany) to the nearest 0.1 cm. Body Mass Index (BMI) was obtained by the equation = weight (kg)/ height^2 (m).

STROBE statement checklist[13] for the appropriate reporting of cross-sectional studies was performed. These recommendations, collected in 22 items, describe the proper way of reporting the title, abstract, introduction, methods, results, discussion and funding.

Statistics

Descriptive data was presented as mean ± standard deviation (SD). One-sample K-S test (Kolmogorov-Smirnov test) was performed in order to assess if each variable fits a normal distribution. Variance homogeneity analysis and ANCOVA, adjusting by BMI, were used to compare data between different subgroups (except in BMI comparisons). Multiple linear regression was computed for correlations between variables, adjusting by other co variables with all the participants and separated by sex. LFMDA was considered such an independent variable, and the other dependents (except BMI).

The level of statistical significance was established at $p \leq 0.05$, with a confidence interval for differences of 95%. Effect sizes were calculated using the partial eta-squared statistic (ηp^2) to establish the substantive meaningfulness of the differences found. This analysis was performed using SPSS IBM Statistics version 24 for Windows package (Illinois, USA).

Results

Table 1 exhibited descriptive characteristics of the total sample and data obtained separated by gender. There are statistical significant differences on BMI between high and low LFMDA score in all group ($p = 0.045$, $\eta p^2=0.156$) and females ($p=0.003$; $\eta p^2=0.287$). Regarding the rest of variables, there are no differences in either the female or the male comparison.

In relation to ANCOVA comparison between BMI and subgroup variables showed significant differences (see table 2). Sailors with more than 6 years of experience had a higher BMI than sailors with 6 or less years of experience, being statistically significant those differences in relation to BMI and ranking position, the group of sailors ranked on top position presented differences between subgroups, increased BMI in sailors with better ranking position. Besides, from different boat classes, there are significant differences on BMI between sailors of Laser Radial, 4.7 and 470, ordered from highest to lowest, respectively. Nevertheless, no observed differences on gender, age or number of training per week subgroups were found.

Regarding to ANCOVA comparison adjusting by BMI between LFMDA and subgroups of gender, age, BMI, number of trainings per week, years of experience, ranking and boat class; did not show significant differences (see table 2).

In order to investigate the relation between different study variables, multiple regression analysis was performed adjusted by BMI. This

Table 1. Description and comparison of participants (ANCOVA[a]).

	All (n=75)		Female (n=25)		Male (n=50)	
	LOW LFMDA (n 47)	HIGH LFMDA (n=28)	LOW LFMDA (n 11)	HIGH LFMDA (n=14)	LOW LFMDA (n=36)	HIGH LFMDA (n=14)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
LFMDA	4.0 (1.1)	6.9 (0.9)	3.7 (1.4)	6.9 (0.9)	4.1 (1.0)	6.9 (0,9)
Age	15.7 (1.8)	15.7 (1.8)	15.6 (1.2)	15.4 (1.5)	15.7 (2.0)	16.0 (2,1)
BMI	20.5 (2.6)	21.8 (2.3)*	18.9 (2.1)	21.9 (2.6)**	21 (2.6)	21.6 (2.2)
N Training	2.3 (1.2)	2.3 (1.1)	2.3 (1.3)	2.4 (1.2)	2.3 (1.2)	2.2 (1.0)
Expertise	6.4 (3.0)	7.1 (5.0)	6.0 (3.5)	6.0 (1.8)	6.5 (2.9)	8.2 (6,8)
Ranking	19.4 (14.3)	16.7 (14.3)	24.9 (15.8)	20.9 (15.1)	17.8 (13.6)	12.4 (12.5)

[a]:ANCOVA Comparison were performed adjusting by BMI, expect on BMI comparison. LFMDA: Low Fat Diet Adherence; HIGH LFMDA: ≥6 points; LOW LFMDA: <6 points; BMI: Body Mass Index; N Training: Number of Trainings per week; Expertise: Number of years of expertise; Ranking: Classification at Championship; *: pvalue <0.05; **: pvalue <0.01 ANCOVA comparison adjusting by BMI in Female group.

Table 2. Características Sociodemográficas de Madres.

			Low Fat Diet Adherence[a]				BMI			
Variable	Subgroup	n	Mean	(SD)	ηp²	Sig	Mean	(SD)	ηp²	Sig
SEX	Female	25	5.5	(2.0)	0.050	0.066	20.6	(2.7)	0.011	0.366
	Male	50	4.9	(1.6)			21.2	(2.5)		
Age	≤ 15 years old	40	5.1	(1.7)	0.000	0.655	20.5	(2.1)	0.050	0.054
	> 15 years old	35	5.1	(1.8)			21.6	(2.9)		
BMI kg/m2)	Normal weight	70	5.1	(1.7)	0.010	0.323				
	Overweight	5	5.6	(1.8)						
N Training / week	≤ 2	63	5.0	(1.8)	0.000	0.680	20.8	(2.6)	0.032	0.126
	>2	12	5.5	(1.4)			22.0	(1.9)		
Expertise	≤ 6 years	28	5.1	(2.0)	0.010	0.427	19.9	(1.8)	**0.106**	**0.004**
	>6 years	47	5.1	(1.6)			21.6	(2.7)		
Ranking	Top Ranking	58	5.1	(1.7)	0.000	0.725	22.2	(3.3)	**0.066**	**0.026**
	Botton Ranking	17	5.2	(1.7)			20.6	(2.2)		
Boat Class	Laser 4.7	45	5.1	(1.8)	0.020	0.480	20.3	(2.1)	**0.259**	**0.000**
	Laser Radial	21	5.4	(1.6)			23.0	(2.6)		
	Laser 470	9	4.2	(1.6)			21.0	(1.8)		

analysis did not show significant associations between LFMDA results and the other variables with all the participants (R^2= [0.094 – 0.109]; β= [-0.135 – 0.037]). Associations did not appear either when the analysis was performed separating the groups by gender, female (R^2= [0.234 – 0.290]; β= [-0.252 – 0.049]) or male (R^2= [0.053 – 0.072]; β= [-0.142 – 0.143].

Discussion

The characteristics of elite young sailors indicate that these athletes showed differences in LFMDA by BMI and gender. In this sense, sailors with the largest adherence to low fat diet have high value of BMI, within normal weight parameters. A higher weight, within normal weight values, provides sailors with advantages on sailing situations with medium and strong wind condition, because when the boat is horizontal (flat) in relation to the water, less friction and higher performance sailors will get[14]; being the weight of sailors and their ability to perform and maintain the hiking position the only way to resist the strength that wind applies on the sail[15].Higher weight sailors should have the advantage of resisting wind strength more easily, decreasing effort perception, both, physical and psychologically[1,2,4]. On the contrary, lower weight sailors show an important handicap towards this issue, before starting the regatta, since they know it will be a conditioning factor.

Regarding BMI, Laser Radial sailors have a higher BMI than Laser 4.7 and 470 sailors. This difference appears due to the fact that Laser Radial is a single handle boat, which requires a higher physical performance on the part of the sailor, since its sail surface is larger than in laser 4.7. Moreover, there is only one sailor while in 470 there are two sailors. There is also a difference in relation to expertise level. Before sailing Laser Radial sailors might have previously sailed a minor boat as 4.7 or a double handle boat as 470. It can be stated that Laser Radial sailors were previously laser 4.7 sailors.

At sailing, as any other sport, expertise defines performance level, the higher number of experiences, the better response sailor will be able to have during a regatta and, therefore, there is a higher probability of getting good results[1–4]. In the case of sailing, training usually takes place at weekend, thus, it is not common training during weekdays. In addition, weather conditions cannot be controlled, soft wind conditions don´t allow sailing during weekends, those days are lost on the training program. Due to those factors, sailors who train during week days make a great difference in opposition to those who only train on the weekends, since the former can double experience and level of training hours in short periods. If there is an interest at increasing sailors' performance, they should train during weekdays.

More experienced sailors (6 or more years of sailing) have a higher BMI, due to their age and boat demands, since they sail Laser Radial. They also get a greater performance during the race. Therefore, usually more experienced sailors get a better ranking position, because they have been training during more time and performed more sailing training sessions in their career.

Top ranking sailors have a greater BMI. As it has already been mentioned, strong wind applies a great strength over sails and, therefore, when sailors have a greater BMI, it will be easier for them to resist those wind conditions, sailing in a flat position (horizontal) and, consequently, a greater performance[14].

Related to limitations, there is a need to value body composition using kinanthropometry or densitometry. Indeed, for future investigation, the possibility to include evaluations of diet-nutritional strategies of sailors during training days and competitions will be considered. Moreover, how sailors increase or decrease their weight to obtain advantages over their boat category will be studied; as in other sport, it can involve different diet strategy. In addition, authors consider for future studies the possibility to include the same number of male and female sailors, nevertheless, the results of the present study do not showed differences between sex groups in results.

The main conclusion of this study was that LFMDA affect at BMI in young sailors. Experienced sailors presented high BMI. Sailors with higher BMI showed better performance (ranking position). There are not correlations between LFMDA and number of training, expertise or ranking position..

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