

# The usefulness of sports medical examinations to detect and prevent eating disorders

Antonio Rodríguez Martínez

Diplomado Universitario en Enfermería. masQsano Salud y Deporte S.L.P. Almería.

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## Summary

**Introduction and objectives:** Eating disorders are a growing problem in our society, especially among young people. The aim of this study is to know which are the individual and social factors that support and perpetuate the danger of suffering from eating disorders, and their possible consequences on the sports and academic performance of individuals.

**Material and method:** The sample consisted of 395 athletes between 12 and 16 years of age ( $M = 14.07$ ;  $SD = 1.35$ ), of whom 142 (35.9%) were female and 253 (64.1%) male. A questionnaire was administered to collect information on sociodemographic data, body image, use of social networks, social relationships, sports practice, risk of eating disorders, and academic and sports performance. In the analysis, firstly, cross-tabulations were carried out to observe the body distortion of the respondents according to body mass index; secondly, a linear regression was performed to analyze the factors influencing the risk of eating disorders. In addition, correlations were performed to find out the relationship between risk of manifesting eating disorders and academic and sports performance.

**Results:** The main result shows that there is a high risk of eating disorders among young athletes, due to a high distortion of body image, which becomes the main determinant factor. In addition, relationships with family and friends have a significant influence on this danger. On the other hand, behaviors related to eating disorders cause academic and sports performance to decrease.

**Conclusión:** Due to these data, it is necessary to generate and promote prevention and early detection guidelines during adolescence.

## Key words:

Eating disorders. Body image. Social networks. Athletes.

## Utilidad del reconocimiento médico deportivo para detectar y prevenir trastornos de la conducta alimentaria

### Resumen

**Introducción y objetivos:** Los trastornos alimenticios son un problema creciente en nuestra sociedad, en especial entre los jóvenes. El objetivo de este estudio es conocer cuáles son los factores individuales y sociales que apoyan y perpetúan el peligro de padecer trastornos de la conducta alimenticia, y sus posibles consecuencias en el rendimiento deportivo y académico de los individuos.

**Material y método:** La muestra la componen 395 deportistas entre 12 y 16 años ( $M = 14,07$ ;  $DT = 1,35$ ), de los cuales 142 (35,9%) son mujeres y 253 (64,1%) hombres. Se administró un cuestionario para recabar información sobre datos sociodemográficos, imagen corporal, uso de redes sociales, relaciones sociales, práctica deportiva, peligro de padecer trastornos de la conducta alimenticia y rendimientos académico y deportivo. En el análisis se llevaron a cabo, en primer lugar, tablas cruzadas para observar la distorsión corporal de los encuestados en función del índice de masa corporal; en segundo lugar, una regresión lineal para analizar los factores influyentes en el peligro de padecer trastornos de la conducta alimenticia. Además, se realizaron correlaciones para averiguar la relación entre peligro de manifestar trastornos de la conducta alimenticia y el rendimiento académico y deportivo.

**Resultados:** El resultado principal muestra que existe un peligro alto de trastornos de la conducta alimenticia por parte de los jóvenes deportistas, a partir de una elevada distorsión de la imagen corporal que se convierte en el factor mayormente determinante. Además, las relaciones con la familia y amigos tienen influencia significativa ante este peligro. Por otro lado, las conductas relacionadas con los trastornos alimenticios hacen que el rendimiento académico y deportivo baje.

**Conclusión:** Debido a estos datos, se hace necesario generar y promocionar pautas de prevención y detección temprana durante la adolescencia.

## Palabras clave:

Trastornos alimentarios. Imagen corporal. Redes sociales. Deportistas.

Correspondence: Antonio Rodríguez Martínez

E-mail: antorodri8@gmail.com

## Introduction

Eating disorders (EDs) are a public health problem (Gómez *et al.*, 2018)<sup>1</sup>. Such disorders can be classified into several groups with very diverse characteristics (see American Psychiatric Association, 2013)<sup>2</sup>. However, anorexia and bulimia nervosa have received the greatest attention in the scientific literature because they present similar behaviours in terms of body image, social relationships, interaction with food, etc., and their perpetuation may be due to similar causes (Modica, 2020)<sup>3</sup>: dissatisfaction with body image, fear of gaining weight and obsessive thoughts about eating, leading to serious modifications in the daily diet, sometimes eating small amounts and sometimes in excess or performing purging behaviours (American Psychiatric Association, 2013<sup>2</sup>; Behar *et al.*, 2014<sup>4</sup>; Ponce *et al.*, 2017<sup>5</sup>).

Even before their manifestation and clinical detection, these disorders affect the individual's self-esteem, social relationships and academic and work performance (Avila *et al.*, 2019)<sup>6</sup>. In the face of this situation, health professionals rely on different standardised measurement scales to observe the incipient condition: SCOFF, BITE, BES, BULT, EAT-40, EAT-26, TFEQ/EI, etc. (Vela *et al.*, 2017)<sup>7</sup>, detection instruments which they use as screening and study tools.

The scientific literature and professionals that focus on people suffering from these disorders argue that we are facing multifactorial phenomena: biological, psychological, family and social. Therefore, the social-ecological model of analysis is especially important (Wang *et al.*, 2013)<sup>8</sup>. This model is organised around three factors: one, the sociocultural factor, in which the different settings in which the subject operates are taken into account; two, the sociodemographic factor, defined by sex or age; and three, the psychological factor, inherent in each subject. Consequently, three aspects come into play: personal characteristics, social characteristics and how the individual reacts to them through self-assessment and social comparison (Festinger, 1954)<sup>9</sup>.

EDs had, until now, been considered an almost exclusively female problem (Fitzsimmons-Craft *et al.*, 2014<sup>10</sup>; Torres, 2019<sup>11</sup>; Schaefer *et al.*, 2014<sup>12</sup>); however, there is an increasing prevalence among men (Ferreiro *et al.*, 2012<sup>13</sup>; Veses *et al.*, 2014<sup>14</sup>). Meanwhile, the bulk of sufferers is still found in adolescents between the ages of 12 and 18\*<sup>15</sup> (Villegas-Moreno, 2021)<sup>16</sup>, a critical stage for developing body image and greater susceptibility to possible body dysmorphic and eating disorders (Gaete *et al.*, 2020<sup>17</sup>; Klump, 2013<sup>18</sup>).

Adolescents and young people who do sport are not immune to this situation, especially so considering that in addition to the pressure and ideals of beauty observed in their social environments and/or peer groups, they are also under physique-related pressure to improve their athletic performance (see, among others, Fitzsimmons-Craft *et al.*, 2014<sup>10</sup>; Monserrat *et al.*, 2021<sup>19</sup>; Villar, 2017<sup>20</sup>). This is so to the point that the term *athletic anorexia* has been coined to refer to the set of subclinical

eating behaviours manifested by athletes to arrive at a physique which comes as close as possible to the desirable image associated with their particular sport (Baquero, 2020)<sup>21</sup>.

And that is not all, because young athletes are not just exposed to environmental and sports-related pressure. They also have to deal with the Internet, where, on the one hand, they have ready access to content on famous personalities/athletes with whom they can compare themselves and, on the other, they are bombarded with advertising which, on certain occasions, does not correspond to reality or is misleading. According to AHAB (Associació Contra l'Anorèxia i la Bulímia; Association against Anorexia and Bulimia) (2020)<sup>22</sup>, social networks, together with the need to adapt to and preoccupation with a slim body ideal associated with social, family and professional success, could be a factor which explains physiological vulnerability to presenting an ED. How individuals use the Internet plays an important role in both the prevention and development of EDs. In adolescence, Instagram, Facebook or YouTube, whose main content consists of images, can negatively affect body self-perception (Pérez and Cassany, 2018)<sup>23</sup>, whether one just views images or actually creates content, since they can generate dissatisfaction with one's physique, due to the mismatch between the ideal of beauty and one's own reality (Romo del Olmo, 2020)<sup>24</sup>, even leading to the use of filters and/or retouching to modify the physique in order to publish a supposedly perfect image to please as many people as possible (Romo del Olmo, 2020)<sup>24</sup>.

In short, bearing in mind the different scenarios which can act as predisposing factors and triggers for EDs, we decided to study this phenomenon with young athletes in a Spanish province, focusing on social and individual factors. Taking into account the preceding literature, an emphasis was placed on comparisons based on sex (Fitzsimmons-Craft *et al.*, 2014<sup>10</sup>; Schaefer *et al.*, 2014<sup>12</sup>) and age in a sports environment (Ferreiro *et al.*, 2012<sup>13</sup>; Chardon *et al.*, 2016<sup>25</sup>).

## Materials and methods

The sample was selected from among those taking part in a sports injury prevention and medical examination programme run by a company specialising in sports clubs in a Spanish province. The sample consisted of 395 athletes (all of whom agreed to participate voluntarily) between the ages of 12 and 16 ( $M = 14.07$ ;  $SD = 1.35$ ), of which 142 (35.9%) were female and 253 (64.1%) male. Their sports were football (47.1%), basketball (19.2%), handball (19%), swimming (1.8%), rugby (4.1%) and volleyball (6.3%).

The report that the participants completed, with the help of a professional, consisted of several sections: socio-demographic data, data related to body image, use of social networks, sports activity, social relationships and questions related to academic and athletic performance.

\* However, these conditions are increasingly affecting the adult population (Letelier, 2021)<sup>15</sup>.

The *Sick, Control, One, Fat, Food* (SCOFF) questionnaire (Morgan *et al.*, 1999)<sup>26</sup> was also used to analyse the presence of warning signs signalling the presence of Eating Disorders (Anorexia Nervosa or Bulimia Nervosa). The original questionnaire consists of five dichotomous (yes, no) questions. The respondents get one point for every “yes” answer. A score of 2 or more indicates a highly likely case of anorexia or bulimia. For our study, because all the questions on the questionnaire required an answer on a scale of 0 to 5, the Scoff score ranged from 0 to 25. Consequently, 10 points meant risk of an ED and more than 15 indicated a high risk.

The questionnaire was computerised and answered anonymously through the Limesurvey platform. The data was collected between September and November 2022. The respondents were interviewed individually in the presence of professionals, with the prior consent of their sports clubs and/or those responsible for them.

Initially, descriptive statistics (mean and standard deviation) were calculated to observe the prevalence of EDs. Next, to study the respondents’ body image disturbance, the BMIs of the study subjects and the subjective diagnoses that they themselves gave were cross-tabulated.

Subsequently, following the social-ecological model (Wang *et al.*, 2013)<sup>8</sup>, we performed a linear regression analysis to discover the different factors that influence the development of ED risk. Given the high number of initial variables and high correlations between some of them, a factor analysis with orthogonal rotation (maximum-likelihood method) was conducted beforehand (varimax: KMO = 0.818; ig. = 0.000) to reduce dimensionality and avoid multicollinearity problems.

Finally, to calculate the possible consequences of the risk of developing an ED, we made correlations between Scoff and the variables related to hours of sleep, concentration when studying and physical and mental fatigue.

Data analysis was performed using SPSS-27 for Windows.

However, the study had limiting factors which need to be taken into consideration. First, the sampling was not random. Therefore, it did not give representative data for each group of athletes. This information is crucial, especially for elite athletes, due to the demands of different sports in terms of weight and/or muscle mass (see Baile *et al.*, 2021)<sup>27</sup>.

Second, there may be non-observation errors (Groves, 1989)<sup>28</sup> due to the impossibility of obtaining all the influential variables, such as, for example, psychological variables.

Third, the possibility of measurement errors, due to the fact that the surveys were carried out during the medical examinations, which, although the questionnaire was short, meant that the attitude and cooperation of the subjects were subject to haste.

Fourth, BMI is not a fully objective tool to diagnose normal, insufficient or excess weight and even less so in the sports population, given that the index only takes into account weight and height, ignoring information as useful as muscle mass and its percentage with respect to fat mass.

Fifth, we consider age a limiting factor, since the subjects surveyed were passing through a stage of life in which numerous changes in

body composition occur, typically as a result of growth and social influence.

And, sixth, there was no non-athletic control group to be able to compare the level of significance of the variables in the two populations.

## Results

According to the data in Table 1, 77.7% showed some type of risk of suffering an ED and 22.3% showed a high risk (M = 13.3; SD = 3.33). If we look at sex, we observed that 76.7% of the females and 78.1% of the males revealed some type of risk. And, analysing this according to age (Figure 1), we saw that most of the “risk” scores came between 14 and 15 years, and most of the “high risk” scores were at the age of 16. 12-year-olds got the most “no risk” scores.

To recode the participants’ Body Mass Index (weight/height<sup>2</sup>), we took into account their age range (12-16 years) and the considerations that this entails. For children under 14 years of age, a BMI under 15 kg/m<sup>2</sup> was considered underweight; a BMI between 15 and 21 kg/m<sup>2</sup> was considered normal weight; a BMI between 21 and 25 kg/m<sup>2</sup> was considered overweight; and a BMI over 25 kg/m<sup>2</sup> was considered obesity. For participants aged between 14 and 16, a BMI under 16 kg/m<sup>2</sup> was underweight; a BMI between 16 and 24 kg/m<sup>2</sup> was normal weight; a BMI between 24 and 27 kg/m<sup>2</sup> was overweight; and a BMI over 27 kg/m<sup>2</sup> was obesity (Alvero *et al.*, 2010)<sup>29</sup>.

The mean BMI of the sample analysed was M = 21.3 (SD = 2.1). With the recoded data, we observed that 4.1% were overweight, 0.3% were

**Table 1. Risk of EDs in the surveyed population. Differentiation by sex and age.**

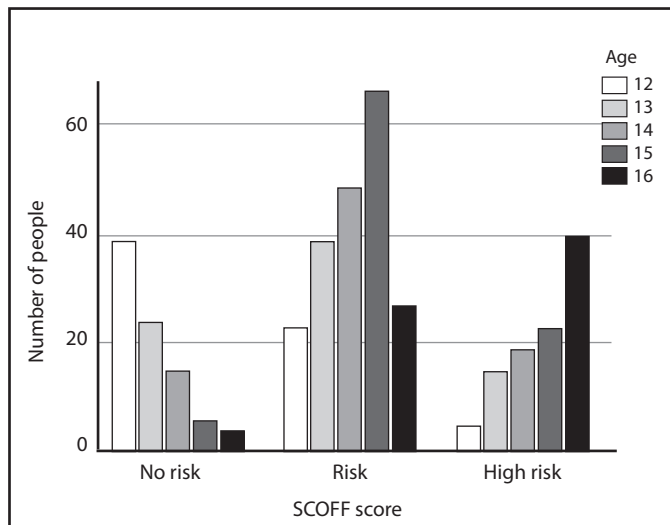
SCOFF	Female n (%)		Male n (%)		Total n (%)	
No risk	33 (23.2)		55 (21.7)		88 (22.3)	
Risk	77 (54.2)		128 (50.5)		205 (51.9)	
High risk	32 (22.5)		70 (27.6)		102 (25.8)	
Age	12	13	14	15	16	Total
No risk	39 (56.9)	24 (30.8)	15 (18.1)	6 (5.3)	4 (4.5)	88
Risk	23 (35.4)	39 (50)	49 (59)	67 (70.5)	27 (38.8)	205
High risk	5 (7.7)	15 (19.2)	19 (22.9)	23 (24.2)	40 (56.7)	102

\*X<sup>2</sup> = 1.251\*; p = 0.001; \*\*X<sup>2</sup> = 111,384\*; p = 0.001.

**Table 2. Response to the statement “I think I’m fat”**

	N	%
Never	51	12.9
Rarely	143	36.2
Sometimes	120	30.4
Almost always	67	17
Always	13	3.3

Figura 1. Riesgo de TCA en la población encuestadas.



obese, 84.3% were normal weight and 11% were healthily underweight. None of the participants were unhealthily underweight.

Although most of the population surveyed had BMIs considered within their "normal" range and only 4.4% were overweight or obese, it was observed that 20.3% "considered themselves fat" always or almost always, and as many as 30.4% considered themselves fat sometimes (Table 2).

Because the data were considered disparate between objective BMI value and perception by the respondents, we cross-tabulated BMI and the answer to the question "I think I'm fat" to see the extent of body image disturbance among the respondents (Table 3). The Chi-square values accept the null hypothesis and, therefore, there is no relationship between feeling fat and BMI. In all, of the athletes with a BMI considered "normal", 16.1% said they feel fat almost always and 3.6% always. And of the athletes with a BMI considered "underweight", 23.3% feel fat almost always and 2.3% always.

In order to find out which variables predict the variability of the risk of suffering an ED through linear regression, we first reduced the

Table 3. Response to the statement "I think I'm fat" and its relationship with BMI.

I think I'm fat	Body Mass Index			
	Low Weight	Normal weight	Overweight	Obese
Never	5	45	1	0
Rarely	11	126	4	1
Sometimes	16	94	7	
Almost always	10	53	4	0
Always	1	12	0	0
Total	43	330	16	1

$\chi^2 = 9.201^*$ ;  $p = 0.686$ .

Table 4. Total Variance Explained.

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	4.09	29.22	29.22	2.68	19.14	19.14
2	2.87	20.51	49.73	1.84	13.14	32.28
3	1.29	9.22	58.95	1.83	13.04	45.32
4	1	7.13	66.09	1.15	8.22	53.54

Extraction method: maximum likelihood.

Table 5. Degree of saturation of the items in each factor.

	Factor 1	Factor 2	Factor 3	Factor 4
I would like clothes to look better on me	-0.069	0.166	0.730	0.114
I would like a different physique	0.065	0.235	0.757	0.047
I follow someone on social media if they are nice and make me feel good	0.137	0.694	0.260	0.131
I follow someone on social media if they are good-looking and have a good physique	0.104	0.799	0.145	0.044
I would like to interact with more people	0.194	0.582	0.204	0.035
I would like to be the centre of attention in the team	0.003	0.282	0.165	0.205
I would like to be slimmer	-0.067	0.232	0.670	0.112
In the last few weeks, I've spent time with my friends	0.253	0.118	0.163	0.790
In the last few weeks, I've had fun with my friends	0.428	0.135	0.115	0.568
My friends and I help each other	0.569	0.084	-0.222	0.253
I have enough money to do the same things as my friends	0.743	0.023	-0.008	0.175
I get enough money for my expenses	0.765	-0.033	0.083	0.103
I can talk to my parents whenever I need to	0.695	0.220	-0.094	0.068
My parents have enough time for me	0.638	0.272	-0.097	0.065

different behavioural variables into factors through the percentage of total variance explained (TVE). 66.09% was reached in the extraction (Table 4), which is an acceptable result because the minimum threshold of 60% was exceeded (Hair *et al.*, 2010)<sup>30</sup>.

4 factors were extracted (Table 5). We called Factor 1 social and economic cooperation. It is saturated with the following variables: my friends and I help each other; I have enough money to do the same

things as my friends; I get enough money for my expenses; I can talk to my parents whenever I need to; my parents have enough money for me.

We call Factor 2 social networks. It is saturated with the following variables: I follow someone on social media if they are nice and make me feel good; I follow someone on social media if they are good-looking and have a good physique; I would like to interact with more people; I would like to be the centre of attention in the team.

Factor 3 takes the name of body image because it is saturated with related variables: I would like my clothes to look better on me; I would like a different physique; I would like to be slimmer.

And finally, Factor 4 is called relationship with friends. It contains: in the last few weeks I've spent time with my friends; in the last week I've had fun with my friends.

Linear regression was determined using the stepwise variable selection procedure with the dependent variable Scoff score and the four factors defined above and the individual variables age and BMI as independent variables. Table 6 shows the descriptive statistics of the variables entered. No data are given on sex because it was entered as a dummy variable.

Table 7 summarises the model. It should be noted that the R<sup>2</sup> reaches 76%, which indicates the goodness of fit of the model and the

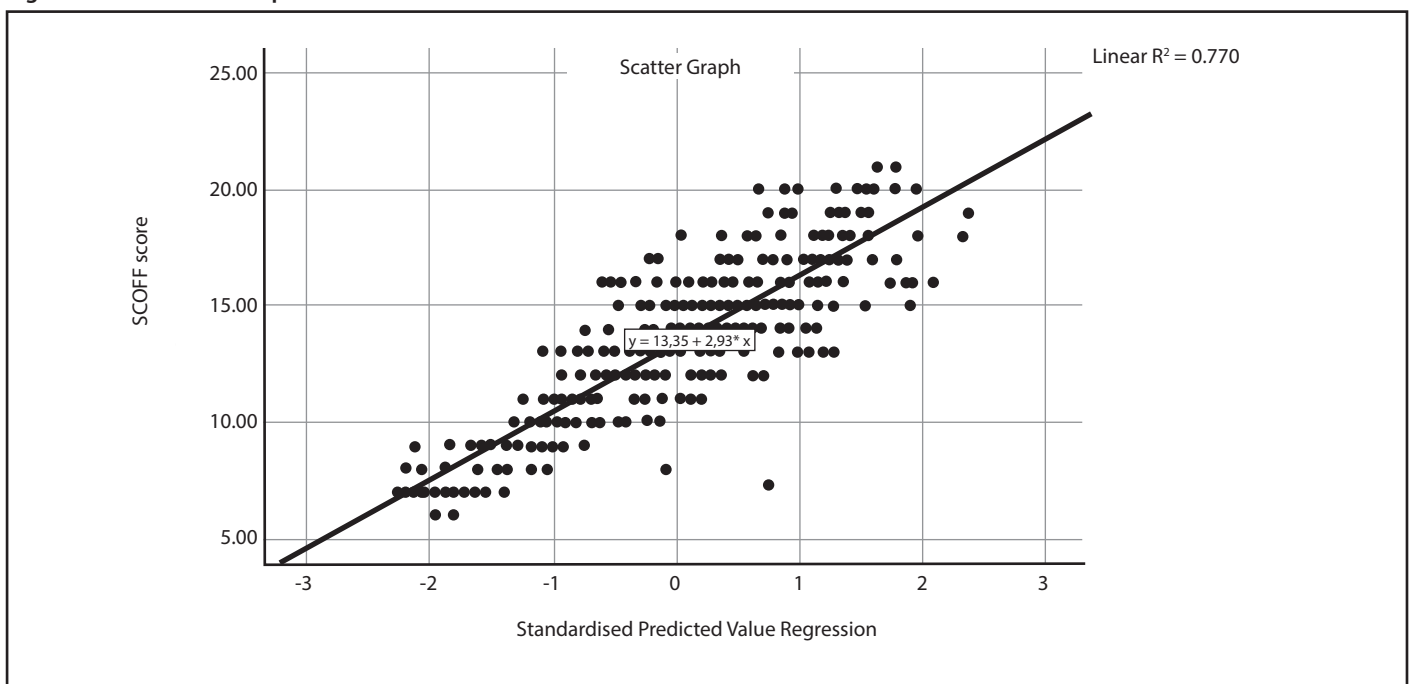
**Table 6. Descriptive statistics of the variables entered in the linear regression.**

	N	Mean (SD)	Skewness	Standard Error	Kurtosis	Standard Error
Age	395	14.07 (1.353)	-0.95	0.123	-1.202	0.245
Body Mass Index	391	21.349 (2.199)	0.296	0.123	0.757	0.246
Factor 1	393	0.00 (0.903)	-0.065	0.123	-0.537	0.246
Factor 2	393	0.00 (0.874)	-0.066	0.123	-0.246	0.246
Factor 3	393	0.00 (0.873)	-0.061	0.123	-0.498	0.246
Factor 4	393	0.00 (0.840)	-0.373	0.123	-0.003	0.246
SCOFF score	390	13.35 (3.334)	-0.090	0.124	-0.586	0.247

**Table 7. Summary of the model (dependent variable SCOFF score).**

Model	Input variables	R	R-squared	Adjusted R-squared	Durbin-Watson
1	Factor 3	0.841	0.707	0.706	
2	Factor 3 Factor 1	0.854	0.730	0.729	
3	Factor 3 Factor 1 Age	0.862	0.751	0.749	
4	Factor 3 Factor 1 Age BMI	0.866	0.764	0.762	1.892

**Figure 2. SCOFF index dispersion.**



**Table 8. Linear regression analysis.**

Variables	Model 1	Model 2	Model 3	Model 4
Body image	0.841**	0.832**	0.779**	0.780**
Social and economic cooperation with family and friends		-0.152**	-0.139**	-0.145**
Age			0.128**	0.108**
BMI				0.081**

\*\*The correlation is significant at the 0.001 level

\*The correlation is significant at the 0.005 level

high capacity of the independent variables to explain the variance of the Scoff score.

Similarly, taking the Durbin-Watson statistic as a reference with the reference values for our sample and the number of variables considered in the linear regression, it can be understood that there is no autocorrelation (positive or negative) (Figure 2).

Table 8 shows the linear regression bringing in different models:

In model 1 (sig. = 0.000), the variables related to body image (factor 3) (sig. <0.001) appear with a positive sign, so those who are significantly interested in how their clothes look on them, would change their physique and would like to be slimmer are more likely to have an ED.

Model 2 (sig. = 0.000) contains the variables related to body image (factor 3) (sig. <0.001) and social and economic cooperation (negative) (factor 1) (sig. <0.001). In this case, when there is no intergroup peer support, the individual has less money than their peers or does not talk to their parents when faced with problems, the danger of suffering an ED increases.

Model 3 adds age (sig. < 0.001) to the previous factors (sig. < 0.000), showing that there is a greater risk of suffering an ED as the study population becomes more adult.

Finally, model 4 (sig. <0.001) adds BMI (sig. = 0.002), showing that the higher this indicator, the greater the risk of having an eating disorder.

In summary, it can be seen that concern about body image has the greatest explanatory weight regarding the danger of developing

**Table 9. Correlations between Scoff score and athletic and academic performance (N = 393).**

	Scoff	Hours of sleep per day	Do you have trouble concentrating?	Do you feel tired?	Do you feel tired in training?
Scoff					
Pearson correlation	1	-0.251**	-0.122**	-0.193**	-0.376**
Sig. (2-tailed)		<0.001	0.01	<0.001	<0.001

\*The correlation is significant at the 0.05 level

\*\*The correlation is significant at the 0.005 level

an ED, followed by social and economic cooperation with family and friends, age and BMI. Sex and the relationship with friends factor were excluded from the model because they did not significantly increase the variance explained.

The last objective of the study was to find out the degree to which the danger of suffering from an ED is related to the athletic and academic performance of adolescents. The answers to the questions posed were on a Likert-type scale from “yes, usually” to “no, never”.

Table 9 shows that there is a significant correlation between positive Scoff scores and not sleeping much, concentration problems and physical and psychological fatigue. The variable with the highest correlation was fatigue after training; the more tired the individual felt as a result of physical activity, the greater the risk of EDs.

## Discussion and conclusions

The aim of this study was to pinpoint the individual and social factors which pave the way towards and perpetuate the danger of suffering from eating disorders, and to analyse the consequences such disorders may have on the sports and academic performance of adolescent athletes.

When held up against other studies for the same age group (Villegas-Moreno, 2021)<sup>16</sup>, the chief findings of this study show a higher prevalence of danger of developing EDs in the young population that does sport. And not just that; the prevalence of danger of presenting EDs in the athlete population is also related to the type of sport. There are studies that claim that this is a consequence of the requirements or norms considered beneficial for performance (see, among others, Baile *et al.*, 2021<sup>27</sup>; Monserrat *et al.*, 2021<sup>19</sup>).

This study does not expose any difference between the sexes. Unlike other studies, which point towards a greater rate of disorder in the female population (Torres, 2019<sup>11</sup>; Schaefer and Thompson, 2014<sup>12</sup>), neither the descriptive data nor the significance values in the linear regression support such a distinction. Therefore, we stress a need to work on prevention from a more age-based rather than sex-based perspective, considering age a more predictive factor. This may be because both the males and the females are in a stage of constant growth and development, and are continuously evaluating themselves and comparing themselves with their peers, be it in their class, school or sports team, and/or with famous people they see on social networks. However, due to the results found, we believe that it would be important and interesting for prevention work to be carried out prior to the adolescent stage (before the age of 12 or 13).

Another aspect to highlight is the lack of relationship between objective and subjective body image values. The fact that a large part of the respondents say they feel fat despite the fact that BMI data show that the vast majority are at normal weight highlights two main ideas supported by the data from the study: 1) the presence of body image disturbance; 2) body dissatisfaction. Both are related to current beauty standards (see Villegas-Moreno, 2021)<sup>16</sup>, where body dissatisfaction is related to body fat (Neves *et al.*, 2017)<sup>31</sup>.



Consequently, there is a well-defined relationship between danger of ED and body image. The result of the linear regression clearly shows this, dissatisfaction with body image having the greatest explanatory weight despite the normal weights found. Secondly, although they explain the danger of EDs to a lesser extent, social and economic co-operation relationships are another factor that go some way towards explaining the model inasmuch as the less social and economic cooperation young people experience with their peers and family members, the more likely they are to suffer from eating disorders.

Similarly, the data show, in our case, that social networks, as a whole, do not show a significant relationship with the danger of developing an ED. However, that it is not the most determining factor in the danger of developing EDs highlights the fact that it is not simply consumption of networks that is a factor when it comes to determining EDs but rather using them as tools for relationships and aspiration. That is to say, following someone who is attractive in itself does not pose a danger, but it can be dangerous when following someone is used for comparison and as a model to follow and/or imitate because "I express dissatisfaction with my body and I want to look like him/her" (Aznar *et al.*, 2020<sup>32</sup>; Romo del Olmo, 2020<sup>24</sup>).

As for the relationship between developing an ED and sports and academic performance, we find that there is a relationship between the danger of developing EDs and feeling tired in day-to-day life, getting little rest and having problems concentrating. This demonstrates, as other studies highlight, the relationship between physiological and psychological problems and EDs (AHAB, 2020; American Psychiatric Association, 2013<sup>2</sup>; Contreras *et al.*, 2021<sup>33</sup>).

In our case, feeling tired and danger of developing an ED is not related to the number the hours of sport, unlike previous studies where the time dedicated to sport is positively related to the danger of developing an ED (Baquero, 2020<sup>21</sup>; Ventura-Cruz *et al.*, 2022<sup>34</sup> and Márquez S, 2008<sup>35</sup>). This situation can be explained because in our case the subjects' exercise is guided and supervised by coaches with a focus on competition. However, if in addition to the activities scheduled by their club, the subjects engage in more sports activity and suffer greater fatigue, they are at risk, because this "excess" has a more narcissistic rather than competitive component.

In short and in conclusion, despite the limitations, we believe that this study is of high explanatory and probative value, allowing us to list several proposals for action:

One, implement prevention programmes from an early age because, as has been seen, the danger increases with age.

Two, implement health promotion programmes where, in addition to working on eating and sports-related habits, aspects related to body image are also addressed.

Three, design interventions based on age, in addition to sex, given that the data on body image dissatisfaction and risk of EDs are becoming increasingly similar between the sexes.

Four, when designing interventions, pay particular attention to the athlete population because, as we have observed, there is a very

high risk of EDs among athletes. We even recommend differentiating between athletes according to type of sport both for diagnosis and for prevention and intervention.

By means of conclusion, we would like to highlight two points: first, that the young participants in the study have not been diagnosed, which shows that excessive preoccupation for the physique can lead to behaviour or attitudes that can affect the health before any disorder is diagnosed. Even more, if these co-morbidities are never diagnosed, they can persistently affect lifestyle. And second, the results support the undertaking of longitudinal studies in which the variability of the different dimensions analysed and their degree of influence on danger of developing EDs are observed over time.

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## Conflict of interest

The authors declare that they are not subject to any type of conflict of interest.

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