Eating disorders, sport practice and physical self-concept in adolescents

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Trastornos de la conducta alimentaria, práctica deportiva y autoconcepto físico en adolescentes

Summary

Introduction. *The expansion of eating behavior disorders (EBD) has made it necessary to carry out the work of detecting cases as well as explaining this phenomenon as much as possible with certain features of the subjects and the behavior habits, for example, the practice of sports.*

Method. *A total of 740 students between 12 and 16 years old, whose sport's activity was investigated, filled out the Eating Disorders Inventory (EDI). Part of this sample, specifically 180 subjects, also answered the recently made Physical Self-concept Questionnaire (PSQ).*

Results. *Prevalence rates of EBD greater than those found in previous studies are found; the risk of EBD has an inverse relationship with the practice of sports and a direct one with low score on the PSQ.*

Conclusions. *Physical and sport education should have a decisive role in the prevention of EBD; educators must be provided guidelines and resources that can help them in this task.*

Key words: *Physical self-concept. Eating disorders. Pupils. Preadolescence. Sport.*

Resumen

Introducción. *La expansión en nuestra sociedad de los trastornos de la conducta alimentaria (TCA) exige, junto a las labores de detección de casos, precisar en lo posible la relación de este fenómeno, tanto con determinados rasgos de la personalidad de los sujetos como con sus hábitos de conducta, como puede ser la práctica deportiva.*

Método. *Setecientos cuarenta estudiantes de entre 12 y 16 años, cuya actividad deportiva se indagó, cumplimentaron el inventario de trastornos de la conducta alimentaria (EDI). A una parte de esa muestra, en concreto a 180 sujetos, se les pasó además un Cuestionario de Autoconcepto Físico (CAF) de reciente construcción.*

Resultados. *Aparecen unos índices de prevalencia de TCA superiores a los hallados en estudios previos; el riesgo de TCA guarda relación inversa con la práctica deportiva y directa con puntuaciones bajas en el CAF.*

Conclusiones. *La educación física y deportiva está llamada a cubrir un decisivo papel en la prevención de los TCA; urge proporcionar a los educadores pautas y recursos que les ayuden en esta labor.*

Palabras clave: *Autoconcepto físico. Trastornos de la conducta alimentaria. Escolares. Preadolescencia. Deporte.*

INTRODUCTION

The alarming increase experienced by the incidence and prevalence of the eating behavior disorders (EBD) in the last thirty years has generated social concern. It is not surprising that epidemiological studies have been carried out on the reach of the problem; these studies try to identify its link with certain personality characteristics or with behavior habits and try to develop primary prevention strategies, beginning with the early detection of its symptoms in increasingly large young groups of our society. In the following, we offer a view of the status of the question and then present the purpose of our study.

Eating behavior disorders (EBD) appear characteristically in economically developed countries of Europe and North America. They specifically affect women, in a rate of more than 9 to 1 in regards to men, although an increase in the cases diagnosed in the male population has recently been observed[1]. These are perfectly documented from pre-adolescence, a period in which there are high rates of body dissatisfaction and diet behaviors[2,3] as well as the desire to lose weight and to reach ideal thinness[4]. Even during ages ranging from 8 to 13 years, some children already believe that it is better to weigh less, although they do not necessarily believe that they need to lose weight[5].

Epidemiological studies performed in Spain offer valuable information on the prevalence rates of eating di-

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sorders, although this information is still fragmented and limited[6,7] and has not always been obtained with adequate and extensive sampling[8,9].

In an investigation carried out with a sample of secondary school students from Langreo (Asturias) using the Eating Disorders Inventory (EDI)[10] as screening instrument, it was found that 7.7% of the women and 1.1% of the men surveyed presented potential risk of developing EBD[11].

Global prevalence of EBD in women was 4.7 % in a study performed in the Madrid Community[9]. The data were obtained from a sample of 1200 students from 4 out of 17 school centers in the municipality of Mostoles. A cutoff for the screening was established at greater than 50 in the EDI, although most of these cases corresponded to partial syndromes.

In 2000, Pérez-Gaspar et al.[6] placed the global prevalence in a female adolescent population from Navarra at 4.1%, warning, however, that if the partial or subclinical forms of the EBD were counted, the rate values would be much higher.

This short review of the present status of the question makes it possible to establish some useful conclusions for our purposes: *a)* the cutoff in the responses to EDI is generally established at 50, after which it is inferred that there is a potential risk of developing some type of eating disorder[7,6]; *b)* the percentages of risk cases are increased when partial and subclinical forms are included; *c)* it is necessary to clarify what the first symptoms are which, already from at the time of childhood and preadolescence, provide the prognosis of the appearance of EBD, and *d)* it is necessary to continue to perform studies that X-ray the epidemiological course that this phenomenon is going to experience.

The EBDs are related with certain personality characteristics, among which self-concept stands out. For some years[12], it has been indicated that the main symptom of anorexia is dissatisfaction with one's own body image, the negative physical self-concept.

Body weight is related with the onset of eating disorder symptoms[13]. A high rate of body mass tends to appear in association with the desire to lose weight and to achieve a thinner body[14,15,5]. Furthermore, body dissatisfaction has been identified in preadolescent girls and not only in those who show high levels of body mass index (BMI), but also in girls with normal weight[16].

However, much more than weight, the perception of one's own body is important; dissatisfaction with one's own body image is essential in the genesis of eating disorders. Body dissatisfaction appears as a direct cause of EBD[17]; having negative feelings towards one's own body can even be the only significant predictor of the appearance of EBDs two years later[18].

Internalization of social pressure in favor of thinness is a clear cause of body dissatisfaction[19]. Dissatisfaction with one's own body originates in the attitudes and beliefs that the present Western culture fosters regarding the ideal of beauty and, more specifically, regarding the importance of thinness[20,16,21]. This pressure, stronger on the population in general, is especially exerted on the female population[22]. Those who personify the characteristics of the model have reasons to positively self-evaluate themselves; and those who become distant from it have a higher risk of decreasing their self-esteem. The importance of thinness in the present society is so great that it is difficult to distinguish those who really suffer EBD from those who do not[23,24].

Regarding the relationship between age and body dissatisfaction, the data of the investigations carried out up to now are not conclusive. While some of the studies have identified cases at the age of 9 years[25], and even after 6-7 years[26], the investigation carried out by Sands and Wardle in 2003 does not verify this earliness[16].

In summary, dissatisfaction with one's own body is generally associated with a low degree of self-esteem. And one of the corollaries of the relationship between low self-esteem and negative attitudes in regards to eating behaviors is that the physical self-concept rates can serve as indicators of possible eating disorders.

The relationships between EBDs and the practice of sports merit attention, it being foreseeable that they interconnect in several ways.

On the one hand, the positive bidirection influence produced between the practice of sports and physical self-concept is known.

On the other, physical hyperactivity is found to be (together with self-provoked vomiting, self-provoked intestinal purges and consumption of anorexigenic or diuretic drugs) one of the ICD criteria established by the WHO to diagnose EBDs when produced in company of a significant weight loss (BMI $\leq$ 17,5) caused by the patient by avoiding the eating of fattening foods[27].

Resorting to physical exercise and sports to regulate body weight can lead to inadequate practices, such as excessive exercise, or very selective ones, searching for those exercises that wear down body areas or that reduce specific areas, avoiding or rejecting sports that develop muscle[28]. However, there are no conclusive data on when the relationship between normal practice of sports and the body image disorders is positive or negative[29,30]. While men who do much exercise offer high levels of body satisfaction, the same does not occur with women. This may be due to the fact that women exercise to loss weight or maintain it while men exercise to compete or to obtain muscle[31].

With this theoretical review as a background, our investigation has aimed to: *a)* supply new information on the demographic reach of the EBDs in adolescence; *b)* verify if there are correlations between the EDI scales and the PSQ (Physical Self-concept Questionnaire); *c)* verify if there are differences in the variables measured by these questionnaires based on the Body Mass Index, and *d)* identify possible associations between eating behaviors, physical self-concept and the practice of sports.

METHOD

Sample

In the first phase of this study, a total of 740 students from 12 to 16 years participated and filled out the EDI

questionnaire. Of these, 343 studied in two school centers of the province of Burgos (one located in Miranda de Ebro and the other in the capital of Burgos) while the other 393 studied in two schools in Irun (Province of Guipúzcoa). The male (n = 366) and female (n = 374) representation as well as the distribution into three age groups (12-13, 14-15 and 16 years or older) was balanced, as can be observed in table 2.

A recently made Physical Self-concept Questionnaire (PSQ) was also administered to part of this sample, to be specific, to 180 subjects.

Instruments

The EDI is a self-applicable questionnaire that evaluates behaviors and psychological characteristics of EBD. It has 64 items that are grouped into 8 scales: drive for thinness, bulimia, body dissatisfaction, negative self-evaluation, perfectionism, interpersonal distrust, interoceptive awareness and maturity fears. The first 3 analyze concern for the body and foods while the remaining five measure more general psychological features, related with the social and one's self-concept.

The PSQ is an original instrument in Spanish recently constructed by Goñi, Liberal and Ruiz de Azúa (in press)[32] which, in its present experimental phase, offers satisfactory psychometric indexes. It has 36 items distributed into 6 subscales, of which 4 (physical ability, physical condition, physical attractiveness and strength) are considered sub-dimensions of physical self-concept. The two other scales measure general physical self-concept and general self-concept.

The BMI, also known as Quetelet's index, is defined as the ratio obtained on dividing weight in kilograms (kg) by square of height (m^2). Based on the BMI, three categories were established: low weight (BMI < 20), normal weight (BMI 20-25) and overweight (BMI > 25).

RESULTS

Differences in the responses to the EDI scales

Prevalence data of the EBDs obtained in this study (see table 1) is very superior (21.21 %) to those identified in the previous investigation when the score of 50 on the EDI is maintained as a screening point. On the contrary, they approach those of other studies if only those scores that exceed the mean by two sigmas are taken as a counting criterion, which, in this case, would be equivalent to placing the screening point at 64: the percentage would remain at 6.35. As a third option, the resulting data are offered when the two following references converge: *a)* a score of 50 or more in the EDI, and *b)* a body mass index ≤ 17.5. On the other hand, there are no statistically significant differences between the number of cases of the men and of the women.

TABLE 1. Prevalence of eating disorders as a function of the cutoff in the total EDI score

	Total-EDI ≥ 64	*Total-EDI ≥ 50*	*Total EDI ≥ 50 & BMI ≤ 17.5*
Men	3.38 % (n = 25)	11.89 % (n = 88)	4.73 % (n = 35)
Women	2.97 % (n = 22)	9.32 % (n = 69)	5.67 % (n = 42)
Total	6.35 % (n = 47)	21.21 % (n = 157)	10.40 % (n = 77)

Central tendency measures (mean and standard deviation) have been obtained in the different EDI scales. Furthermore, analyses have been performed to verify if significant differences are produced based on gender and school cycle (T-test) as well as based on age (Anova). The results are shown in table 2 (table 2).

The data obtained based on the endpoint gender show significant differences in all the EDI scales, except in interpersonal distrust and in identification of interoception in which both the men and women offer similar indexes. The girls present greater drive for thinness ($t = -4.201$; $p < 0.001$), as well as greater body dissatisfaction ($t = 5.661$; $p < 0.001$) and negative self-evaluation ($t = -2.255$; $p < 0.05$). On the other hand, both in the bulimia scale ($t = 2.776$; $p < 0.01$) as well as in that of perfectionism ($t = 4.687$; $p < 0.001$) and in maturity fears ($t = 2.790$; $p < 0.01$), the men score higher than the women. No statistically significant differences are produced between girls and boys in the total-EDI scale ($t = -1.626$; $p = 0.104$).

Regarding age, there are two endpoints in which the differences are not significant: drive for thinness ($F = 1.027$; $p = 0.359$) and maturity fears ($F = 0.897$; $p = 0.408$). On the other hand, a significant increase is found in association with age in bulimia ($F = 21.289$; $p > 0.001$), body dissatisfaction ($F = 15.292$; $p < 0.001$), negative self-evaluation ($F = 17.363$; $p < 0.001$), interpersonal distrust ($F = 7.943$; $p < 0.001$) and identification of interoception ($F = 7.970$; $p < 0.001$). Perfectionism decreases with age ($F = 5.341$; $p < 0.01$). The total-EDI scale presents higher scores at higher age ($F = 12.541$; $p < 0.001$).

When school cycle is taken as reference, the data reveal that the drive for thinness remains constant in the two cycles. This also occurs for interpersonal distrust, identification of interoception and maturity fears. Bulimia ($t = -4.616$; $p < 0.001$), body dissatisfaction ($t = -3.899$; $p < 0.001$) and negative self-evaluation ($t = -3.294$; $p < 0.001$) are greater in the second cycle than in the first. However, perfectionism is greater in those of the first cycle ($t = 2.556$; $p < 0.05$). The total sum of the EDI scales is significantly greater in the second cycle students ($t = -2.605$; $p < 0.01$).

Table 3 shows the differences found when relating the responses to the EDI with practice of sports.

Significant differences are observed in all the EDI scales except for the dimension maturity fears in which practicing a sport, either usually or sporadically, has no relation with the psychological state of mind to mature. Those persons who practice a sport sporadically present greater drive for thinness ($t = 3.164$; $p < 0.01$), greater bulimia ($t = 2.091$; $p < 0.05$), greater body dissatisfaction

TABLE 2. Scores on the EDI scales based on gender, age and school cycle

		Gender		*Age*			*School cycle*	
		Man	*Woman*	*12-13*	*14-15*	*≥ 16*	*First cycle*	*Second cycle*
Drive for thinness	X (σ)	3.03 (3.28)	4.23 (4.43)	3.61 (3.64)	3.51 (4.15)	4.17 (4.14)	3.65 (3.77)	3.62 (4.11)
	Sig.	0.000***			0.359		0.921	
Bulimia	X (σ)	1.87 (2.53)	1.39 (2.23)	1.00 (1.98)	1.95 (2.60)	2.54 (2.40)	1.19 (2.15)	2.15 (2.53)
	Sig.	0.006**			0.000***		0.000***	
Body dissatisfaction	X (σ)	5.64 (5.32)	8.13 (6.56)	5.68 (5.76)	7.31 (6.33)	9.41 (5.46)	5.95 (5.99)	7.69 (6.14)
	Sig.	0.000***			0.000***		0.000***	
Ineffectivness	X (σ)	4.26 (4.19)	5.01 (4.84)	3.77 (4.04)	4.82 (4.74)	6.83 (4.63)	4.04 (4.37)	5.14 (4.63)
	Sig.	0.24*			0.000***		0.001**	
Perfectionism	X (σ)	5.55 (3.45)	4.43 (3.03)	5.42 (3.24)	4.79 (3.25)	4.30 (3.45)	5.32 (3.23)	4.70 (3.32)
	Sig.	0.000***			0.005**		0.011**	
Interpersonal distrust	X (σ)	3.86 (3.51)	3.64 (3.64)	3.33 (3.45)	3.76 (3.60)	5.02 (3.67)	3.48 (3.58)	3.96 (3.56)
	Sig.	0.406			0.000***		0.70	
Interoceptive awareness	X (σ)	4.27 (3.96)	4.64 (4.84)	3.97 (4.22)	4.46 (4.33)	6.05 (5.08)	4.12 (4.43)	4.74 (4.40)
	Sig.	0.259			0.000***		0.57	
Maturity fears	X (σ)	7.50 (3.57)	6.78 (3.47)	7.33 (3.90)	6.96 (3.30)	7.12 (3.05)	7.35 (3.83)	6.95 (3.26)
	Sig.	0.005**			0.408		0.125	
Total-EDI	X (σ)	35.97 (17.43)	38.30 (21.20)	34.12 (17.45)	37.62 (20.49)	45.43 (19.53)	35.12 (18.71)	38.84 (19.90)
	Sig.	0.104			0.000***		0.009**	
N	Group	366	374	309	339	92	337	403
	Total	740			740		740	

* p < 0.05; ** p < 0.01; *** p < 0.001.

(t = 6.578; p < 0.001), greater negative self-evaluation (t = 7.317; p < 0.001), greater interpersonal distrust (t = 5.515; p < 0.001) and greater identification of interoception (t = 4.836; p < 0.001). However, perfectionism is less in those who do not usually practice a sport (t = –6.583; p < 0.001). In regards to the total-EDI scale, the indexes are greater when sports are practiced sporadically (t = 5.591; p < 0.001).

On the other hand, the type of sports that is practiced is also associated with the responses to the EDI ques-

TABLE 3. Scores on the EDI scales based on the practice of sports and the type of sports

		Practice of sports		*Type of sports*	
		Sporadic	*Usual*	*Free*	*Organized*
Drive for thinness	X(σ)	4.30 (4.08)	3.32 (3.84)	4.26 (4.09)	3.19 (3.79)
	Sig.	0.002**		0.000***	
Bulimia	X(σ)	1.89 (2.43)	1.49 (2.37)	1.93 (2.46)	1.42 (2.34)
	Sig.	0.037*		0.005*	
Body dissatisfaction	X(σ)	8.96 (6.30)	5.87 (5.75)	8.67 (6.00)	5.66 (4.80)
	Sig.	0.000*		0.000***	
Ineffectivness	X(σ)	6.34 (4.88)	3.79 (4.11)	6.15 (4.82)	3.56 (4.01)
	Sig.	0.000***		0.000***	
Perfectionism	X(σ)	3.91 (2.69)	5.54 (3.43)	4.29 (2.94)	5.49 (3.44)
	Sig.	0.000***		0.000***	
Interpersonal distrust	X(σ)	4.77 (3.86)	3.24 (3.32)	4.63 (3.77)	3.10 (3.28)
	Sig.	0.000***		0.000***	
Interoceptives awareness	X(σ)	5.58 (5.05)	3.90 (3.97)	5.41 (4.,95)	3.75 (3.85)
	Sig.	0.000***		0.000***	
Maturity fears	X(σ)	7.10 (3.43)	7.16 (3.58)	7.21 (3.48)	7.07 (3.58)
	Sig.	0.800		0.610	
Total EDI	X(σ)	42.84 (21.98)	34.34 (17.41)	42.53 (21.04)	33.26 (17.26)
	Sig.	0.000***		0.000***	
N	Group	248	492	307	433
	Total	740		740	

* p < 0.05; ** p < 0.01; *** p < 0.001.

tionnaire since the subjects who practice a free sport (or who do not practice any sport) have higher indexes of drive for thinness ($t = 3.639$; $p < 0.001$), of bulimia ($t = 2.846$; $p < 0.01$), of body dissatisfaction ($t=6.803$; $p < 0.001$), of negative self-evaluation ($t = 7.944$; $p<0.001$), of interpersonal distrust ($t = 5.863$; $p < 0.001$) and of identification of interoception ($t = 5.118$; $p < 0.001$). Furthermore, the total-EDI is greater in this group ($t = 6.549$; $p < 0.001$). In addition, significant differences are observed in perfection-ism: specifically those who perform an affiliated sport are more perfectionists than those who perform it freely ($t = –4.968$; $p < 0.001$). No significant differences in regards to maturity fears are verified.

Table 4 shows the relationships identified between the responses to EDI and the BMI.

The relationships are noticeable; specifically those subjects who present greater body mass offer higher values in drive for thinness ($F = 7.782$; $p < 0.001$), as well as in body dissatisfaction ($F = 11.425$; $p < 0.001$), negative self-evaluation ($F = 4.498$; $p < 0.05$) and in interpersonal distrust ($F = 6.193$; $p < 0.01$). Regarding perfectionism, this is greater in the thinness and decreases in the subjects who have a greater BMI ($F = 9.535$; $p < 0.001$).

TABLE 4. Scores on the EDI scales based on body mass index (BMI)

	BMI	*N*	*X*	σ	*F*	*Sig.*
Drive for thinness	Low weight	358	3.02	3.60		
	Normal weight	324	3.95	4.04	7.782	0.000***
	Overweight	58	5.03	3.94		
Bulimia	Low weight	358	1.44	2.31		
	Normal weight	324	1.98	2.61	3.949	0.020*
	Overweight	58	1.74	1.70		
Body dissatisfaction	Low weight	358	5.81	5.59		
	Normal weight	324	7.77	6.30	11.425	0.000***
	Overweight	58	8.95	5.50		
Ineffectivness	Low weight	358	4.31	4.37		
	Normal weight	324	7.97	4.82	4.498	0.011*
	Overweight	58	6.41	4.40		
Perfectionism	Low weight	358	5.33	3.26		
	Normal weight	324	4.86	3.36	9.535	0.000**
	Overweight	58	2.97	2.31		
Interpersonal distrust	Low weight	358	3.52	3.42		
	Normal weight	324	3.89	3.75	6.193	0.002**
	Overweight	58	5.64	4.03		
Interoceptives awareness	Low weight	358	427	4.26		
	Normal weight	324	4.83	4.74	1.457	0.234
	Overweight	58	4.95	3.55		
Maturity fears	Low weight	358	7.26	3.67		
	Normal weight	324	7.05	3.38	1.191	0.305
	Overweight	58	7.95	3.77		
Total-EDI	Low weight	358	35.01	18.67		
	Normal weight	324	39.29	20.52	6.077	0.002**
	Overweight	58	43.64	14.87		

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Physical self-concept, body mass index and responses to EDI

Physical self-concept, by the PSQ, has a clear association with the BMI (table 5).

Physical self-concept lowers as the body mass increases. This happens in this way in all the PSQ scales except in perception of strength, which increases with the increase of BMI. The lower the BMI, the greater the perception one has of physical ability ($F = 5.068$; $p < 0.01$), of physical condition ($F = 14.145$; $p < 0.001$) and of physical attractiveness ($F = 5.910$; $p < 0.01$); furthermore general physical self-concept ($F = 6.711$; $p = 0.001$) and general self-concept ($F = 3.652$; $p < 0.05$) are significantly greater.

And finally, the correlations obtained on correlating the responses to the two questionnaires used, the EDI and PSQ, are presented (table 6).

There is a high correlation between the responses to the PSQ questionnaire and the responses to those scales of the EDI that are most directly related with the EBDs. In fact, there is a high relationship between body dissatisfaction and physical condition scales, physical attractiveness, general physical self concept and general self-concept ($r = –0.389$ to $–0.555$; $p < 0.01$) of the PSQ. The lowest correlation is produced with the physical ability scale ($r = –0.179$; $p < 0.05$). In addition, similar correlations have been obtained of the bulimia scale with the general physical self-concept, physical attractiveness and general self-concept scales ($r = –0.205$ to $–0.321$; $p < 0.01$). The negative self-evaluation scale of the EDI ($r = –0.274$ to $–0.385$; $p < 0.01$) have been correlated with these same scales of the PSQ; the relationship with physical condition ($r = –0.155$; $p < 0.05$) must be added to

TABLE 5. Relationship between the PSQ scales and body mass

Scales	*BMI*	*N*	*Mean*	σ	*F*	*Sig.*
Athletic and sports competition	Low weight	163	25.60	5.90		
	Normal weight	152	24.47	5.98	5.068	0.007**
	Overweight	30	22.00	5.87		
Physical condition	Low weight	163	26.04	6.33		
	Normal weight	152	24.05	6.42	14.145	0.000***
	Overweight	30	19.57	6.14		
Physical attractiveness	Low weight	163	24.94	7.08		
	Normal weight	152	24.35	6.65	5.910	0.003**
	Overweight	30	20.17	8.18		
Strength	Low weight	163	21.61	6.00		
	Normal weight	152	23.19	6.26	4.075	0.018*
	Overweight	30	24.40	6.39		
General physical assessment	Low weight	163	27.74	6.05		
	Normal weight	152	26.30	6.66	6.711	0.001**
	Overweight	30	23.27	7.14		
General assessment	Low weight	163	29.08	5.65		
	Normal weight	152	27.91	5.55	3.652	0.27*
	Overweight	30	26.40	5.65		

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

TABLE 6. Corr elations between 5 scales of EDI and the PSQ scales

	Physical ability	*Physical condition*	*Physical attractiveness*	*Strength*	*General pysical self-concept*	*General self-concept*
Drive for thinness	0.151*	–0.026	–0.264**	0.058	–0.133	–0.229**
Bulimia	–0.065	–0.106	–0.207	–0.032	–0.205	–0.321
Body dissatisfaction	–0.179*	–0.389**	–0.454**	–0.108	–0.522**	–0.555**
Ineffectivness	0.010	–0.155*	–0.301	–0.024	–0.274**	–0.385**
Total-EDI	0.105	–0.083	–0.294**	0.033	–0.229**	–0.397**

* $p < 0.05$; ** $p < 0.01$.

this. Furthermore, drive for thinness shows a relationship with the PSQ, although in a lower number of scales, specifically in physical attractiveness ($r = –0.264$; $p < 0.01$) and in general self-concept ($r = –0.229$; $p < 0.01$). Finally, the total-EDI scale has correlated with physical attractiveness ($r = –0.294$; $p < 0.01$), general physical self-concept ($r = –0.229$; $p < 0.01$) and general self-concept ($r = –0.397$; $p < 0.01$).

These data indicate that the higher the score of the EDI, the lower the score of the PSQ, or stated in another way, the greater the risk of eating behavior disorder, the less the physical self-concept. The fact that no EDI scale has correlated significantly with the strength scale of the PSQ suggests that eating disorders have no type of relationship with the level of strength perceived by the subject.

DISCUSSION

In order to be able to adequately carry out work to prevent eating problems, updated information must be available on the frequency and evolution of them in representative samples of the population. The adolescent school population is, for obvious reasons, one of the social segments that requires the greatest attention in this regards. The subjects who participated in this investigation were school children who were studying Secondary Education. And one of the principal concerns of the study was focused on comparing diagnostic criteria and measurement instruments in order to detect this type of problems more effectively and economically and adjusted to the school context.

The data obtained on the prevalence of eating behavior disorders are not reassuring: more than 20 % of the subjects of this study have scores equal to or greater than 50 on the total EDI-scale, and in general, this value does not reach 10 % in other studies. How can these results be explained? Accepting that the data are irrefutable and obstinate, we suggest the following interpretation of them.

We resist accepting that there has been a sudden and alarming epidemiological increase; we do not believe that our adolescent school population has eating disorders in a percentage greater than twenty. Rather, we believe that the explanation is found in other questions, the principal one of them being the limitations of the measurement instrument itself applied to this type of population and under the conditions in which it was filled out. On the one hand, the attitude towards the EDI questionnaire questions of the adolescents of a school population is clearly more uninhibited and less defensive than the clinical population. On the other hand, in several classrooms, manifestations of tiredness and apathy due to the extension of the questionnaire were expressed.

Thus, and to answer the commitment acquired with the schools of indicating possible cases that would require individualized diagnostic care, we believe that not only the responses to the EDI questionnaire, thus applied, should be considered but also, complementarily, the body mass index of the subjects. The result was 77 of the 740 school children of the sample who had both conditions, a double criterion of the score: ≥ 50 in the EDI + BMI ≤ 17.5.

However, our search for an instrument that is recommendable for use in the school context was oriented at identifying convergencies in the results obtained in the PSQ and in the EDI. Under certain contexts, it is very important to use the questionnaire calmly; the classrooms or sports dressing rooms cannot be converted into diagnostic rooms. Thus, interest in verifying if a relatively short questionnaire, such as the PSQ, which is useful for decision making directly related with the educational activity, could also offer some exploratory clues in order to detect possible clinical cases. If coincidences are confirmed between the PSQ and the EDI, the use of the former of these questionnaires outside of the clinical setting could become a rapid and economical way of detecting subjects who present eating behavior disorders or, perhaps, signs of them. Finally, an attempt was made to calibrate the usefulness of the use of the PSQ with preventive purposes.

The results obtained in this regards can be considered encouraging but not final. High correlations have been found between the responses to the PSQ questionnaire and the responses to those scales of the EDI that are most directly related with the EBDs. And this confirms that there is a direct association between low physical self-concept and risk of suffering eating disorders, so that the use of the first index (poor physical self-perception) is authorized to prevent eating disorders. However, based on the available data and in spite of our interest, we have not been able to state what would be the cutoff in which the

responses to the PSQ would correspond with scores of the EDI that identify possible problematic cases. This is one of the questions that remains for future investigations.

In any event, the information provided by the responses to the EDI questionnaire is valuable and consistent with the data of the previous investigation in regards to the variations associated with age and gender. The fact that preadolescent girls tend to score higher than the boys in different scales of the questionnaire, or, what is the same, the fact that the tendency for the eating disorders continues to be a predominantly female feature, is corroborated. A specific piece of information could be surprising: men score higher than women on the bulimia scale; although it should not be overlooked that men probably eat, in fact, more compulsively and in larger quantities than women. In regards to the association with age, the data of this study verify that eating behavior disorders, understanding the high scores on the EDI as signs of them, tend to increase as the adolescence period advances, which calls for special attention to this stage.

The relationships between the practice of sports and responses to the EDI supply interesting elements of clarification about the debate on the relationships between physical exercise and EBD. The best data in the questionnaire are offered by those who practice a sport systematically compared to those who do not practice it or do so only occasionally. This would be a more general conclusion, which is not disqualified by verifications such as those commented in the following: a. those who practice a sport sporadically identify interoception better than those who usually practical a sport; the explanation can be found in the fact that usual practice makes it possible to release certain unpleasant body sensations which, however, continue to exist in those who exercise less systematically; b. drive for thinness is less in those who practice an organized sport; it can be understood that this population group has a more adequate physical form and does not need to lose kilos as much as other groups.

The practice of sports not only appears to be associated with less tendency to eating disorders (lower scores on the EDI questionnaire) but also with a better physical self-concept (high scores on the PSQ). Data in this regards are informative and conclusive. It should not be overlooked, in any event, that these observations are made in a non-clinical school population; they may not correspond with those obtained with another type of population.

The relationship observed between the body mass index (BMI) and physical self-concept PSQ) is also interesting: thinner persons are those who offer the highest body perception while those who are overweight manifest a lower physical self-concept than those of normal weight and those of low weight. Even though this information is not particularly new, what is new is that a new measurement instrument has been obtained in Spanish (the PSQ), and has an accessible application. We would be delighted to provide it to anyone who requests it.

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