

Socio-Demographic, Biopsychosocial and Lifestyle Behaviors Related with Eating Disorders of Children and Adolescents of Costa Rica

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Abstract

The objective of the study was to evaluate the association of sociodemographic, biopsychosocial and lifestyle behaviors (diet, sedentarism and physical activity) with eating disorders (ED) in a national sample of Costa Rican children and adolescents. This was a cross-sectional and descriptive study. A total of 2667 students of elementary, middle and high school from sixty-four educative centers (40 schools and 24 high schools) of Costa Rica participated in the study. The predictive factors associated with ED are: body image dissatisfaction ($\beta = 0.367$; $p < 0.001$), lifetime addictive behaviors ($\beta = 0.131$; $p < 0.001$), to be a girl ($\beta = 0.109$; $p < 0.001$), intentionally hurt or harm itself ($\beta = 0.074$; $p < 0.001$), BMI ($\beta = 0.053$; $p < 0.001$), socioeconomic index ($\beta = 0.052$; $p < 0.001$) and sedentary behaviors ($\beta = 0.051$; $p < 0.001$). While the frequency of physical activity ($\beta = -0.071$; $p < 0.001$), the diet quality index-score ($\beta = -0.068$; $p = 0.010$) and the age ($\beta = -0.064$; $p = 0.001$) are not related with the development of ED. Psychosocial factors (body image dissatisfaction and intentionally self-injure) had the greatest influence (near 27%) of the global variance of the regression model that explained the association with ED. Programs should be promoted to monitor children and adolescents with excess weight, as well as, the coexistence of erroneous weight and body image perceptions in these population. This could protect against the development of ED in children and adolescents. **Evidence-Based Medicine:** Level V of evidence (descriptive study).

Keywords

Eating Disorders, Behaviors, Children, Adolescents, Costa Rica

1. Introduction

Eating disorders (ED) have reached a special relevance in the last years due to their prevalence progression in developed societies. Social pressure has increased over the physical appearance of prepubertal and adolescent girls and boys, especially of women, to whom models of identification are proposed in which the form of the body acquires a value. The desire to modify the body in order to adapt to a model (thin bodies and strict weight control) is a fertile ground for developing ED [1].

Epidemiological studies have found that ED are associated with a wide range of comorbid psychiatric disorders, such as changes in mood, anxiety, impulse control and substance use disorders [2] [3]. It has been documented that ED are associated with depression, low self-esteem, anxiety, perfectionism and obsessive-compulsive traits, compulsive bingeing, alterations in social functioning [3] [4] and suicide attempts [5].

Despite the strong theoretical evidence that exists about ED, it is necessary to generate empirical evidence in particular populations, since there are very few investigations that have studied ED on Latin populations, especially Central American. The lack of data on ED has perpetuated the misperception that Latin-Central American girls and boys do not experience symptoms of ED [1].

In Costa Rica, the study of ED is scarce. In the Current Survey 2017, that explored the prejudices Costa Ricans have about ED [6], among the main results obtained were: near 19.2% of these participants know someone who presents this type of disorder mainly among university students (27.0%), people of high socioeconomic status (26.7%) and mainly women (83.4%). Around 63% of the Costa Rican population surveyed believes that this number will increase, corroborating the presence of this type of disorder in the country, as well as the perceptions about the increase in the number of cases in the near future.

Likewise, culture-specific factors, such as the social values, norms, the internalization of social standards and the tendency to compare one's appearance with those standards and other sociocultural influences contribute to the development of body dissatisfaction [7] [8] and consequently, to increase the probability of developing ED.

On the other hand, Hazzard *et al.* [9] suggest that ED and overweight can occur simultaneously. In Costa Rica, according to the results of the last National Nutrition Survey (2008-2009), more than a quarter (26.4%) of children from 5 to 12 years old and 20.8% of adolescents were overweight or obese; therefore, the prevalence of Costa Rican children and adolescents at risk of developing ED could increase in the for coming years [10].

The interrelation between the consumption of tobacco, alcohol and marijuana with ED has been less documented, at least among Costa Rican children and adolescents. However, the use of tobacco and drugs in adolescents is prevalent in those with ED [11].

Changes in the lifestyles of children and adolescents can affect their biopsy-

chosocial well-being. Sedentary behaviors have been associated with unhealthy eating behaviors and overweight and obesity [12]. Additionally, food commercials in television increase the preference for high-energy foods and the replacement of less publicized foods such as fruits and vegetables [13].

On the other hand, few studies have been conducted on the relationship between physical activity and ED. However, it is known that physical activity could be a protective factor of ED because it reduces the risk of obesity and unhealthy weight control behaviors, but at the same time, in excess, it could become a risk factor for ED (vigorexia) [9].

The objective of this study was to evaluate the association of sociodemographic, biopsychosocial, addictive and lifestyle behaviors (diet, sedentarism and physical activity) with the ED in a national sample of Costa Rican children and adolescents.

2. Method

2.1. Type of Study and Selection of the Population

The study was descriptive and cross-sectional. The population was composed of 2667 elementary, middle and high school students from 64 educative centers (40 schools and 24 high schools) of Costa Rica. The sample size was calculated using the proportional estimation formula, with a confidence level of 95% and an error range of 3%. In each educative center, a total of approximately 42 children and adolescents were randomly selected.

2.2. Data Collection and Analysis Techniques

Elementary students ($n = 389$, 14.6%) were interviewed by the researchers. Middle and high school students ($n = 2278$, 85.4%) were given a validated and self-administered questionnaire under the supervision of the investigators.

1) Sociodemographic data: sex, age and socioeconomic status of the students were determined according to the methodology described by Madrigal [14], for which an index was built, knowing the possession of some specific material goods at home.

2) Biological data: Weight was determined to all students using a Tanita scale model SC-331 S (without column) and height was determined using a freely positioning stadiometer with a wall separator, SECA brand, model 217. BMI (kg/m^2) was estimated for each participant and extended international BMI cut-offs were used to assess nutritional status [15].

3) Psychosocial data: To evaluate body size dissatisfaction the Contour Drawing Rating Scale was used [16]. Participants are asked to rate their ideal figure and their current size [17]. The discrepancy between these size scores was used as an index of body size dissatisfaction. Additionally, a dichotomous question to know if the youngsters intentionally hurt themselves was added to the questionnaire (Have you intentionally hurt yourself (for example: cut, hit or drink something)?).

4) Lifestyle data: The food quality was measured with the Diet Quality Index for children and adolescents of Costa Rica (Núñez *et al.*, unpublished data), comprising a number of habitual daily meals as well as the frequencies of consuming foodstuffs of adequate nutritional value, snacking in between meals, eating just before bedtime and how were fast-food, fruit and vegetable consumed. The sum of screen hours (0 - 24 hours/day) was done, considering the frequency of four sedentary behaviors during weekdays and weekend: watching TV, playing computer or console, connecting to Internet and daily speaking with friends by phone or Skype. A final question about the weekly frequency of physical activity out of school (average ≥ 60 minutes/day: 0: never, 7: daily) was included [18]. In addition, dichotomous questions (yes, no) about the use of tobacco, alcohol (getting drunk), marijuana, cement or glue inhalation and cocaine were considered. One or more cigarette of tobacco or use of drugs during their lives was considered as of risk for elementary school children and of risk for middle and high school adolescents if used in the last 30 days.

5) Dependent variable: An adaptation of the Eating Attitudes Test-26 (EAT-26) was applied [19]. The items provide six response options ranging from 1 (*never*) to 6 (*always*); the three least pathological responses receive 0 points and the other responses 1, 2 and 3 to denote increasing severity. The total score is obtained by the addition of the items, reversed when necessary. A risk index of eating disorders (EDI) was constructed, which was estimated by weighing each of the EAT-26 questions and others suggested by experts in validation workshops. The frequency of each variable presented in the population of children and adolescents was estimated and later its weight was calculated by dividing 1/the proportion of each variable.

2.3. Statistical Analysis

SPSS 24 program for Windows (Statistical Package for the Social Sciences, IBM, Armonk, NY, USA) was used to estimate frequencies and continuous variables were described using mean and SD. A p -value < 0.05 was considered statistically significant. To evaluate the possible associations between the independent variables and the dependent one (eating disorders score), the technique of mandatory introducing all the variables was used (Enter), so the selection process of the predictor variables was manual. Subsequently, the hierarchical regression model was used to select and analyze each group of predictors. Predictors were sex (girls = 1, boys = 0), age (continue variable) and socioeconomic index (continue variable) in the first step; BMI (continue variable) in the second step; the body size dissatisfaction (continue variable) and intentionally harmed themselves (yes = 1, no = 0), in the third step; the number of addictive behaviors (tobacco, alcohol (getting drunk), marijuana, glue or cement inhalation and cocaine) ever experienced, in the fourth step; and in the last step, healthy food index-score (continue variable) and physical activity habits (continue variables): like time spent on sedentary behaviors during weekdays and during weekend and frequency of

physical activity out of school and high school. Checks for overlap among predictors (independent variable and covariates) were conducted with the variance inflation factor and tolerance. The list wise deletion method was used.

3. Results

Table 1 presents the description for each of the dichotomous and continuous variables considered and internal consistency reliability (Cronbach's α value) for

Table 1. Description of national study sample (n = 2667).

Characteristic (dichotomous variables)	n (%)		
Sex: females	1418 (53.2)		
Age groups (years)	7 - 9	372 (13.9)	
	10 - 12	1089 (40.6)	
	13 - 15	877 (32.7)	
	16 - 18	329 (12.3)	
Socioeconomic status	Low	752 (28.2)	
	Medium	1500 (56.2)	
	High	425 (15.6)	
Have you smoked cigarettes (tobacco)	176 (6.6)		
Have you drunk (with alcohol)	370 (13.9)		
Have you smoked marijuana	133 (5.0)		
Have you inhaled glue (cement)	53 (2.0)		
Have you inhaled cocaine	45 (1.7)		
Have you hurt yourself intentionally	233 (8.7)		
Characteristic (continue variables)	Mean (\pm SD)	Internal consistency [†]	
EDS (adaptation of Test-26, total score) (0 - 82)	17.53 (15.01)	0.833	
Age (7 - 18)	12.56 (2.55)	-	
Socioeconomic score (0 - 69)	9.32 (8.80)	0.901	
BMI (kg/m ²) [‡]	19.99 (4.38)	-	
Students who have experienced: (1) addictive behavior		-	
	(2) addictive behaviors	88 (3.3)	-
	(3) addictive behaviors	83 (3.1)	-
	(4) addictive behaviors	11 (0.4)	-
	(5) addictive behaviors	16 (0.6)	-
Body size dissatisfaction (-8 to 8)	1.14 (1.35)	-	
Diet Quality Index (DQI-CR total score) (0 - 141)	71.65 (22.39)	0.899	
Average screen hours (TV, e-games by computer, mobile phone, PlayStation, Wii, among others: 0 - 24 hours/day, during weekdays and weekend)	5.59 (2.26)	-	
Frequency 0 - 7 days/week of physical activity, out of school and high school (average \geq 60 minutes/day)	3.37 (1.39)	-	

[†]Cronbach's α value (mean inter-item correlation); [‡]based on 2637. Thirty students did not consent for the anthropometric measurements. \pm SD: Standard Deviation; n: number of students; %: percentage.

questionnaire scores in the national study sample. The average age of the participants of the study was 12.56 years (± 2.55 SD); a little more than half of the youngsters were girls and 56.2% was of medium socioeconomic level. The socioeconomic score ranged from 0 to 69, whose average was 9.32 (± 8.80 SD); the average of BMI (kg/m^2) was 19.9 (± 4.39 SD) and the average of body size dissatisfaction was 1.14 (± 1.35 SD). Regarding the consumption of illicit drugs (cocaine, marijuana and cement) and licit (tobacco and alcohol), the practice of these habits varied from 1.7% (inhaled cocaine) to 13.9% (drunk with alcohol), being that 12.1% of the students have experienced one addictive behavior and 0.6% all addictive behaviors studied. Likewise, almost 9 out of 100 of the total participants had intentionally hurt themselves, and the range of the risk index of eating disorders (EDI) of students was from 0 to 82, with an average of 17.53 (± 15.01 SD). The range of the score of the dietary quality index (DQI) was 0 to 141, with an average of almost 72 (± 22.39 SD); the average of screen hours was almost 6 (± 2.26 SD) and the frequency 0 - 7 days/week of physical activity, out of school and high school was of 3.37 (± 1.39 SD).

Table 2 shows the final hierarchical multiple regression model that evaluated the observed variations in the association of ED with predictive factors of different types: sociodemographic, biological, addictive, psychosocial and lifestyle behaviors (diet and physical activity). None of the predictors showed problems of collinearity ($\text{FIV} \leq 1.185$ and $\text{Tolerance} \geq 0.844$ and ≤ 0.978) and the final model turned out to be holistic and economical (parsimonious), since with few variables of different types explains a good part of the variations observed in the association with ED (R^2 corrected of 42%).

Table 2. Results of multiple linear regression model.

Predictors	B	Beta	95% IC for B	Sig	R^2	Change in R^2 for the step
Sociodemographic						
-Sex, girls = 1	3.419	0.109	2.219; 4.619	0.000	0.038	-
-Age	-0.532	-0.064	-0.857; -0.208	0.001		
-Socioeconomic Index	1.641	0.052	0.461; 2.821	0.006		
Biological						
-BMI	0.193	0.053	0.048; 0.337	0.009	0.082	0.042*
Psychosocial						
-Body image dissatisfaction	4.330	0.367	3.872; 4.788	0.000	0.404	0.266*
-Intentionally hurt yourself, yes = 1	2.944	0.074	1.416; 4.473	0.000		
Addictive behaviors						
(alcohol, tobacco, marijuana (<i>Cannabis sativa</i>), glue-cement inhalation and cocaine)	2.586	0.131	1.804; 3.369	0.000	0.138	0.056*
Lifestyle						
-Diet Quality Index-score	-0.047	-0.068	-0.074; 0.021	0.000	0.424	0.020*
-Time spent on sedentary behaviors during weekdays and during weekend (0 - 24 hours/day -screen hours average)	1.768	0.051	0.432; 3.104	0.010		
-Frequency of physical activity (average ≥ 60 minutes/day, 0 - 7 days/week) out of school and high school.	-2.291	-0.071	-3.562; -1.020	0.000		

Dependent variable: Eating disorders score; Predictors: sociodemographic, biological, addictive behaviors, psychosocial and lifestyles (food and physical activity). * p -value < 0.001.

According to these results, the predictive factors associated with ED are: body size dissatisfaction ($\beta = 0.367$; $p < 0.001$), lifetime addictive behaviors ($\beta = 0.131$; $p < 0.001$), to be a girl ($\beta = 0.109$; $p < 0.001$), intentionally hurt or harm itself ($\beta = 0.074$; $p < 0.001$), BMI ($\beta = 0.053$; $p < 0.001$), socioeconomic index ($\beta = 0.052$; $p < 0.001$) and sedentary behaviors ($\beta = 0.051$; $p < 0.001$). While the predictive factors that are inversely associated with ED are: the frequency of physical activity ($\beta = -0.071$; $p < 0.001$), the diet quality index-score ($\beta = -0.068$; $p = 0.010$) and the age ($\beta = -0.064$; $p = 0.001$).

Regarding incremental validity, predictors which explained the variance were demographics factors at step 1 (change in $R^2 = 0.038$; $p < 0.001$), BMI at step 2 was statistically significant (change in $R^2 = 0.042$; $p < 0.001$) and the incremental validity of the number of lifetime addictive behaviors at step 3 was statistically significant, too (change in $R^2 = 0.056$; $p < 0.001$). However, the group of variables that most variance explained were those referring to psychological at step 4 (change in $R^2 = 0.266$; $p < 0.001$). Moreover, the lifestyles at step 5 also significantly increased the explained variance (change in $R^2 = 0.020$; $p = 0.001$).

4. Discussion

A positive association was found in this study between the ED and several addictive behaviors experienced by the children and adolescents, their body dissatisfaction and with intentional or deliberate damage to their bodies. These results are consistent with other studies reported in the literature [20] [21]. The results propose that there may be a group of children and adolescents vulnerable to the development of “extreme” behaviors of high risk for health, such as drunkenness, the use of marijuana, cocaine and glue or cement inhalation to intentionally harm themselves and binge eating. Current findings indicate that individual differences and social-contextual influences on adolescent emotionality must be considered [22].

On the other hand, it has been pointed out that the dislike, with itself and with the world, has been implicated as a factor that maintains and exacerbates ED symptoms. Emerging research suggests that dislike may be a risk factor to commit suicide and may indicate risk for suicidal ideation among individuals with eating psychopathology [23].

Although all individuals are exposed to the constant bombardment of unattainable beauty ideals, not all people develop dissatisfaction with their body image and ED. Prepubertal children and adolescents have a high risk of developing ED because they are more sensitive to the family [24], their peers and above all to the exposure of the media in general and social networks [25] that promote the ideal physically. Harmful health communications in social networks can reach large groups of people and continue adding to a culture that values physical appearance in detriment of health [26]. However, a study suggests that peer competition proved to be a strong predictor of the culture of ideal weight and thin body image. It is concluded that the negative influences of social compari-

son are focused on peers rather than television or social media exposure [25]. The results of this study reinforce the importance of choosing holistic, comprehensive and innovative perspectives to study and prevent ED.

Studies demonstrated an association between alcohol consumption and unhealthy food habits. It has been observed the tendency to use extreme forms of weight control to compensate planned binge drinking such as “Drunkorexia” [27].

Likewise, the female sex, the BMI and the socioeconomic index were predictive factors of ED. The results suggest that the higher the BMI and if the sex is female, the higher the association with ED in children and adolescents. This positive relation could be because ED and overweight or obesity generally coexist [9].

Additionally, the presence of bullying that children and adolescents with excess weight usually suffer could increase the chances that they and their aggressors will suffer from ED. Bullying predicts eating disorder symptoms for both bullies and victims [28].

Regarding the socioeconomic index as a predictor of eating disorders, one of the predominant characteristics of these disorders is that they generally occur in patients of a medium-high socioeconomic level [29]. However, it should be considered that socioeconomic levels could be modulated by the socio-cultural standards of appearance, which seem to be not universal [29]. In addition, the socioeconomic consequences of ED should be considered in the future, since their presence during adolescence may set individuals on a different trajectory whereby, they do not have the same opportunities for success in adulthood. This finding confirms the public health message that the ED have lasting negative consequences, especially for women [30].

Also, a positive association was observed between ED and sedentary behaviors. Some studies report that less screen time and more frequent vigorous physical activity were associated with a lower risk of reporting mental health problems among adolescents. Those who reported a combination of engaging in less screen time and more frequent vigorous physical activity had the lowest risk, advising a synergistic relationship between the two behaviors on mental health outcomes [9].

A statistically significant association was also found between age, quality of diet and physical activity and the decrease in the association with ED. These results suggest that physical activity could be acting as a modulating factor for other protective factors, so that children and adolescents do not develop ED, for example, taking care of their body, healthy eating, not using drugs, which helps with the satisfaction of their body image and with a lower risk of suicidal ideation [31].

However, the role of physical activity in the context of body dissatisfaction is still ambivalent. A cross-sectional study revealed that girls showed greater concern about weight and shape and boys about muscularity. Body satisfaction in-

creases with health and fitness motives. Girls who engage in sports do not differ in body dissatisfaction from non-active girls. In sportive girls, weight and shape concerns increased with more health and fitness motives. This study provides the first insights into body dissatisfaction and the different role of physical activity in boys and girls in childhood [32].

Regarding the fact that in this study age resulted in a protective factor of the ED, it could be explained because more than half of the sample studied consisted of youngsters below 13 years of age (average: 12.56 ± 2.55) and in these groups of young children the incidence of restrictive ED exceeds the incidence of type 2 diabetes mellitus [33].

Although it is true that this study does not respond to a longitudinal or retrospective design to ensure that the prepubertal youngsters of the sample showed excess weight at the age of 7, because of the prevalence that has been reported in Costa Rica it is possible that at least a quarter of them had presented overweight or obesity 7 or more years ago [34]. These eating disturbances can result in serious medical consequences, ranging from growth delay to unstable vital signs [33]. In this study (data not shown in tables), more than 60% of students with excess weight reported that they are afraid to weigh too much (61.4%); more than half indicated that they eat large amounts of food “secretly” and without control (52.8%); 14.3% reported that they like to feel an empty stomach and 13.1% indicated their willingness to vomit after eating. These findings are worrisome because it is considered that when two or more questions related to ED are answered affirmatively, there is a risk of suffering it. At a general level, episodes of food bingeing are one of the most prevalent among the ED.

The regression model explained a considerable percentage of global variance (around 40%), in which psychosocial factors had the greatest influence (around 27%), followed by lifetime addictive behaviors (around 6.0%) and lifestyles (healthy food index-score, sedentary behavior and frequency of physical activity) (2.0%).

One of the limitations of this study is the sampling technique used because the multidisciplinary data were collected with a cross-sectional design, limiting the causal inference. Prospective longitudinal studies are necessary because they would allow investigators to determine with greater accuracy the direction of the observed associations but maintaining the line of interdisciplinary for its study and approach.

On the other hand, except for sociodemographic data and BMI, the rest of the variables are based on self-reported measures, which could imply a socially desirable bias. Mixed design studies (longitudinal, prospective and qualitative) are required regarding the evaluation of lifestyles and habits of children and adolescents. With this approach it is possible to differentiate between excessive exercise and the healthy practice of physical exercise and obtain greater details in the measurement of patterns of drug consumption, if it is an occasional, daily or problematic consumption [35]. These data would help to clarify the relationship

between lifestyles and ED.

5. Conclusions

The results highlight the importance of guiding prevention efforts towards the broad spectrum of potentially modifiable individual factors from school age (such as overweight-obesity, body dissatisfaction and internalization of idealized beauty models and drug use) and guide youth towards more active and less sedentary/screen-based lifestyle, considering the use and progress of information and communication technologies. It is necessary to develop innovative educational strategies led by their peers [36] in the educational centers of children and adolescents, who could be identified with the models of beauty and success transmitted by the communication media. This seems to be adequate to prevent problems related to ED, with emphasis on weight, lifestyles (diet and physical activity) and drug use [22].

This study gives solid reasons to suggest governments that they should promote programs that monitor the behavior of children and adolescents with excess weight, given the current context of the increasing prevalence of overweight and obesity and the coexistence of erroneous weight and body image perceptions in these population sectors. Studying simultaneously the association of these factors with ED and monitoring them can contribute to the development of strategies for awareness and more specific and timely attention for the holistic prevention and control of ED that are appearing at shortages.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

Ethical Approval

All procedures performed were in accordance with the ethical standards involving human participants of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

References

- [1] Striegel, R.H. and Smolak, L. (2001) *Eating Disorders: Innovative Directions in Research and Practice*. American Psychological Association, Washington DC.
- [2] Preti, A., Girolamo, G., Vilagut, G., *et al.* (2009) *The Epidemiology of Eating Dis-*

- orders in Six European Countries: Results of the ESEMeD-WMH Project. *Journal of Psychiatric Research*, **43**, 1125-1132.
<https://doi.org/10.1016/j.jpsychires.2009.04.003>
- [3] Blinder, B.J., Camella, E.J. and Sanathara, V.A. (2006) Psychiatric Comorbidities of Female Inpatients with Eating Disorders. *Psychosomatic Medicine*, **68**, 454-462.
<https://doi.org/10.1097/01.psy.0000221254.77675.f5>
- [4] Kaminska, K. and Rybakowski, F. (2006) Comorbidity of Eating Disorders and Bipolar Affective Disorders. *Psychiatria Polska*, **40**, 455-467.
- [5] Franko, D.L. and Keel, P.K. (2006) Suicidality in Eating Disorders: Occurrence, Correlates, and Clinical Implications. *Clinical Psychology Review*, **26**, 769-782.
<https://doi.org/10.1016/j.cpr.2006.04.001>
- [6] Universidad de Costa Rica (2017) Encuesta Actualidades. Escuela de Estadística, Facultad de Ciencias Económicas, Universidad de Costa Rica, San José.
- [7] Zeeni, N., Gharibeh, N. and Katsounari, I. (2013) The Influence of Sociocultural Factors on the Eating Attitudes of Lebanese and Cypriot Students: A Cross-Cultural Study. *Journal of Human Nutrition and Dietetics*, **26**, 45-52.
<https://doi.org/10.1111/jhn.12059>
- [8] Rodgers, R.F., Paxton, S.J. and McLean, S.A. (2014) A Biopsychosocial Model of Body Image Concerns and Disordered Eating in Early Adolescent Girls. *Journal of Youth and Adolescence*, **43**, 814-823. <https://doi.org/10.1007/s10964-013-0013-7>
- [9] Hazzard, V.M., Hahn, S.L. and Sonnevile, K.R. (2017) Weight Misperception and Disordered Weight Control Behaviors among U.S. High School Students with Overweight and Obesity: Associations and Trends, 1999-2013. *Eating Behaviors*, **26**, 189-195. <https://doi.org/10.1016/j.eatbeh.2017.07.001>
- [10] Ministerio de Salud de Costa Rica (2012) Encuesta Nacional de Nutrición 2008-2009, Fascículo 1: Antropometría/Ministerio de Salud, Instituto Costarricense de Investigación y Enseñanza en Nutrición y Salud, Caja Costarricense de Seguro Social, Instituto Costarricense de Estadística y Censos, Instituto Costarricense sobre Drogas. Costa Rica, San José.
- [11] Mann, A.P., Accurso, E.C., Stiles-Shields, C., *et al.* (2014) Factors Associated with Substance Use in Adolescents with Eating Disorders. *Journal of Adolescent Health*, **55**, 182-187. <https://doi.org/10.1016/j.jadohealth.2014.01.015>
- [12] Pearson, N., Biddle, S.J., Williams, L., *et al.* (2014) Adolescent Television Viewing and Unhealthy Snack Food Consumption: The Mediating Role of Home Availability of Unhealthy Snack Foods. *Public Health Nutrition*, **17**, 317-323.
<https://doi.org/10.1017/S1368980012005204>
- [13] Boyland, E.J., Harrold, J.A., Kirkham, T.C., *et al.* (2011) Food Commercials Increase Preference for Energy Dense Foods, Particularly in Children Who Watch More Television. *Pediatrics*, **128**, e93-e100. <https://doi.org/10.1542/peds.2010-1859>
- [14] Madrigal, J. (1997) La construcción de índices. Editorial Universidad de Costa Rica, San José.
- [15] Cole, T.J. and Lobstein, T. (2012) Extended International (IOTF) Body Mass Index Cut-Offs for Thinness, Overweight and Obesity. *Pediatric Obesity*, **7**, 284-294.
<https://doi.org/10.1111/j.2047-6310.2012.00064.x>
- [16] Woodside, B.D. and Staab, R. (2006) Management of Psychiatric Comorbidity in Anorexia Nervosa and Bulimia Nervosa. *CNS Drugs*, **20**, 655-663.
<https://doi.org/10.2165/00023210-200620080-00004>
- [17] Thompson, M.A. and Gray, J.J. (1995) Development and Validation of a New

Body-Image Assessment Scale. *Journal of Personality Assessment*, **64**, 258-269.

https://doi.org/10.1207/s15327752jpa6402_6

- [18] U.S. Department of Health and Human Services (2008) Physical Activity Guidelines for Americans and Youth Physical Activity Guidelines Toolkit. Author, Washington DC. <http://www.health.gov/PAGuidelines/guidelines/chapter3.aspx>
- [19] Garner, D.M., Olmsted, M.P., Bohr, Y., *et al.* (1982) The Eating Attitudes Test: Psychometric Features and Clinical Correlates. *Psychological Medicine*, **12**, 871-878. <https://doi.org/10.1017/S0033291700049163>
- [20] Finistrella, V., Manco, M., Corciulo, N., *et al.* (2015) Eating Disorders and Psychopathological Traits in Obese Preadolescents and Adolescents. *Journal of the American College of Nutrition*, **34**, 142-149. <https://doi.org/10.1080/07315724.2014.938182>
- [21] Larson, N., Davey, C.S., Caspi, C.E., *et al.* (2017) School-Based Obesity-Prevention Policies and Practices and Weight-Control Behaviors among Adolescents. *Journal of the Academy of Nutrition and Dietetics*, **117**, 204-213. <https://doi.org/10.1016/j.jand.2016.09.030>
- [22] Guyer, A.E., Silk, J.S. and Nelson, E.E. (2016) The Neurobiology of the Emotional Adolescent: From the Inside out. *Neuroscience & Biobehavioral Reviews*, **70**, 74-85. <https://doi.org/10.1016/j.neubiorev.2016.07.037>
- [23] Chu, C., Bodell, L.P., Ribeiro, J.D., *et al.* (2015) Eating Disorder Symptoms and Suicidal Ideation: The Moderating Role of Disgust. *European Eating Disorders Review*, **23**, 545-552. <https://doi.org/10.1002/erv.2373>
- [24] Webb, J.B., Rogers, C.B., Etzel, L., *et al.* (2018) “Mom, Quit Fat Talking—I’m Trying to Eat (Mindfully) Here!”: Evaluating a Sociocultural Model of Family Fat Talk, Positive Body Image, and Mindful Eating in College Women. *Appetite*, **126**, 169-175. <https://doi.org/10.1016/j.appet.2018.04.003>
- [25] Ferguson, C.J., Muñoz, M.E., Garza, A., *et al.* (2014) Concurrent and Prospective Analyses of Peer, Television and Social Media Influences on Body Dissatisfaction, Eating Disorder Symptoms and Life Satisfaction in Adolescent Girls. *Journal of Youth and Adolescence*, **43**, 1-14. <https://doi.org/10.1007/s10964-012-9898-9>
- [26] Blackstone, S.R. and Herrmann, L.K. (2018) Extreme Body Messages: Themes from Facebook Posts in Extreme Fitness and Nutrition Online Support Groups. *M Health*, **4**, 33. <https://doi.org/10.21037/mhealth.2018.07.01>
- [27] Lupi, M., Martinotti, G. and Di Giannantonio, M. (2017) Drunkorexia: An Emerging Trend in Young Adults. *Eating and Weight Disorders*, **22**, 619-622. <https://doi.org/10.1007/s40519-017-0429-2>
- [28] Copeland, W.E., Bulik, C.M., Zucker, N., *et al.* (2015) Does Childhood Bullying Predict Eating Disorder Symptoms? A Prospective, Longitudinal Analysis. *International Journal of Eating Disorders*, **48**, 1141-1149. <https://doi.org/10.1002/eat.22459>
- [29] Bernadetta, I. and Katarzyna, S.W. (2018) Sociocultural Appearance Standards and Risk Factors for Eating Disorders in Adolescents and Women of Various Ages. *Frontiers in Psychology*, **9**, 429. <https://doi.org/10.3389/fpsyg.2018.00429>
- [30] Tabler, J. and Utz, R.L. (2015) The Influence of Adolescent Eating Disorders or Disordered Eating Behaviors on Socioeconomic Achievement in Early Adulthood. *International Journal of Eating Disorders*, **48**, 622-632. <https://doi.org/10.1002/eat.22395>
- [31] Vancampfort, D., Hallgren, M., Firth, J., *et al.* (2018) Physical Activity and Suicidal Ideation: A Systematic Review and Meta-Analysis. *Journal of Affective Disorders*, **225**, 438-448. <https://doi.org/10.1016/j.jad.2017.08.070>

- [32] Grimminger-Seidensticker, E., Möhwald, A., Korte, J., *et al.* (2018) Body Dissatisfaction in Normal Weight Children—Sports Activities and Motives for Engaging in Sports. *European Journal of Sport Science*, **18**, 1013-1021. <https://doi.org/10.1080/17461391.2018.1473498>
- [33] Pinhas, L., Morris, A., Crosby, R.D., *et al.* (2011) Incidence and Age-Specific Presentation of Restrictive Eating Disorders in Children: A Canadian Paediatric Surveillance Program Study. *Archives of Pediatrics and Adolescent Medicine*, **165**, 895-899. <https://doi.org/10.1001/archpediatrics.2011.145>
- [34] Núñez, H.P., Monge, R., León, H., *et al.* (2003) Prevalence of Overweight and Obesity among Costa Rican Elementary School Children. *Revista Panamericana de Salud Pública*, **13**, 24-32. <https://doi.org/10.1590/S1020-49892003000100004>
- [35] Curtis, P., Thompson, J. and Fairbrother, H. (2018) Migrant Children within Europe: A Systematic Review of Children's Perspectives on Their Health Experiences. *Public Health*, **158**, 71-85. <https://doi.org/10.1016/j.puhe.2018.01.038>
- [36] Breithaupt, L., Eickman, L., Byrne, C.E., *et al.* (2017) Peer Education: A Model of a Voluntary, After-School Program for Eating Disorder Prevention. *Eating Behaviors*, **25**, 32-37. <https://doi.org/10.1016/j.eatbeh.2016.08.003>