

Parents' and children's perception of health-related quality of life by weight status in Navarra, Spain

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ABSTRACT

Introduction. Overweight-obesity, an endemic disease in developed countries, can lead to physical and psychosocial consequences that impair health-related quality of life (HRQoL). There are some aspects which can be reported by parents, but for others, the patient's subjective point of view is more relevant. The objective of this study was to assess the agreement between the perception of parents and children regarding the HRQoL of 7-11 year old children as per their weight status.

Population and Methods. Cross-sectional study of parent and child dyads. HRQoL assessment using the CHIP-Child Edition questionnaire for children and the CHIP-Parent Report Form for parents. Agreement was assessed using intraclass correlation coefficients (ICC) and dispersion plots.

Results. A total of 152 parent-child dyads were assessed; 55.3% of children had a normal weight, and 44.7% were overweight-obese, with no differences observed in sociodemographic characteristics. Children did not show significant differences as per their weight status. Agreement between parents and children was medium-low (ICC < 0.6) in most domains, in the overall sample and when the sample was divided by weight status. The *Comfort* domain had a higher ICC (0.73) in the overweight-obese group. As per parents' perception, the HRQoL of overweight-obese children was significantly lower in terms of health satisfaction, physical comfort and peer relations.

Conclusions. Agreement between parents and children in their perception of HRQoL as per the children's weight status was medium-low, without any significant differences. Parents' perceived that overweight-obese children had a significantly lower HRQoL.

Key words: HRQoL, agreement between parents and children, overweight, obesity, pediatrics.

of the 21st century, has recognized that it is a serious public health problem.¹ The most recent study conducted in a Spanish population consisting of 8-17 year old children and adolescents (2012) reflects an overweight prevalence of 26% and an obesity prevalence of 12.6%.² As per the most recent survey conducted by the Autonomous Community of Navarra, 19.4% and 8.2% of underage children are overweight and obese, respectively.³

The etiology of obesity has inspired multiple lines of research. Today, it is known that it could be a monogenic or polygenic trait, a primary disease or secondary to other conditions, or be caused by external factors; therefore, it would be more appropriate to talk about several obesity syndromes instead of "obesity."⁴

Overweight-obesity leads to numerous clinical and metabolic complications, in the short and long term: insulin resistance, hypercholesterolemia, type 2 diabetes mellitus, metabolic syndrome, polycystic ovary syndrome, cardiovascular disease.^{5,6} In addition, it is associated to behavioral and psychosocial complications: nutrition disorders, anxiety, depression, dependence, passiveness, reduced academic performance, social isolation, actual or imaginary discrimination, and low self-esteem.⁷⁻⁹

The concept of health goes beyond that of absence of disease. In the case of children and adolescents, the concept of health has certain characteristics, as stated by Starfield: "The measurement of health in children should consider their capacity to fully participate in physical, social and psychosocial

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INTRODUCTION

Changes in lifestyle and nutrition have led to a progressively higher prevalence of overweight and obesity, the most common metabolic disorders in the Western world. The World Health Organization, which has defined obesity as a pandemic

activities and functions adequate to their age."¹⁰ The concept of health-related quality of life (HRQoL) is used in the health field with the belief that patient well-being and how patients experience their disease and the medical care they receive are important factors to be taken into account during their management and follow-up.^{11,12} The HRQoL is a measurement of health from the patient's perspective. In pediatrics, it is common to talk to the patient's parents to obtain information regarding the child's health status. Certain aspects can be directly reported by them. However, when it comes to disease perception and impact, the patient's subjective perspective plays a more relevant role.

There are few studies on how overweight and obesity impact the HRQoL of children, and there are even fewer studies focused on the agreement in the perception of parents and children; and none has been conducted in the Spanish population.

Hypothesis: overweight and obesity can lead to physical and psychosocial consequences that impair the HRQoL. The objectives of this study are:

- 1) to analyze the scores given by 7-11 year old children and their parents to the different HRQoL domains and assess if there are differences as per their sociodemographic characteristics and weight status;
- 2) to assess the agreement of parents' and children's perception of the HRQoL of children as per their weight status.

POPULATION AND METHODS

Study Design

Descriptive, cross-sectional, observational study.

Ethical Aspects

The study was approved by the Ethics and Clinical Research Committee of Clínica Universidad de Navarra in March, 2010.

Study Sample and Participants

Parents and seven to eleven year old male and female children (67 boys and 85 girls) who attended the Clínica Universidad de Navarra for a general pediatric consultation and had a normal weight or were overweight-obese, or who attended a pediatric endocrinology consultation due to overweight-obesity, between April 1st, 2010 and December 15th, 2011, were included; they all voluntarily accepted to participate in the study.

During the consultation, information on the study was provided and the informed consent

was obtained from the participants' parents; children's medical and anthropometric data were recorded and the HRQoL Child Health and Illness Profile-Child Edition (CHIP-CE) and the CHIP-Child Edition/Parent Report Form (CHIP-CE/PRF) questionnaires were delivered.

Inclusion criteria: being 7-11 years old, voluntarily agreeing to participate in the study, and having a legal guardian who provided his/her written informed consent.

Exclusion criteria: having a chronic disease, including a psychiatric condition, except overweight or obesity, or an acute disease that affects the patient's HRQoL, and not providing an informed consent or withdrawing it at any time during the study.

Withdrawal criteria: inability to adequately reply the questionnaires or not answering enough questions.

The sample size was estimated in relation to the 62 overweight or obese patients aged 7-11 years old who were being followed-up at the pediatric endocrinology clinic in the Clínica Universidad de Navarra

Taking into account possible losses and new diagnoses, the estimated minimum sample size was 60 cases and at least one control per case.

Participants' age was restricted to 7 to 11 years old in order not to mix children and pre-adolescents with adolescents. A control group was included to counterbalance the most important background outcome measures in both groups.

Participants (n = 152) were classified as per the body mass index (BMI) recorded during the consultation, taking the reference standards established by Ferrández-Longás, et al. (1980-2002).¹³ The BMI value was chosen because it is widely used to indicate overweight or obesity and correlates with the amount of body fat measured by computed tomography or magnetic resonance imaging, which are reference standards to assess body fat distribution. Participants were considered to have a normal weight if they had a BMI percentile <85 as per their age and sex, they were considered overweight if they had a BMI percentile >85 and <95, and they were considered obese if they had a BMI percentile >95.¹⁴

HRQoL Quantification

The children and parent versions of the self-administered CHIP questionnaires developed by the Public Health Department of the Johns Hopkins Bloomberg School¹⁵ were used.

These are the first self-perceived health measurement tools for children based on a

holistic and multidimensional concept of health published in the literature.¹⁶ The reliability and validity of the Spanish version have been demonstrated.¹⁷ The CHIP-CE is targeted at 7-11 year old children and is grouped in five domains, each covering the information indicated between brackets: *satisfaction* (self-esteem, self-perception, satisfaction with him/herself and with his/her health), *comfort* (physical and emotional comfort, restricted daily activities), *resilience* (family involvement, social problem-solving typical for the age, resilience to physical activity, and health and safety at his/her house/environment), *risk avoidance* (participation in risky activities, attitudes that threaten achievements and peer influence), and *achievement* (academic performance and exercising responsibilities typical for the age). The CHIP-CE/PRF version is for parents of children younger than 12 years old; it gathers the information on the five domains mentioned above and allows to generate 12 subdomains (see Table 4).

The scores are given in the positive meaning of health: that is, higher scores indicate greater satisfaction, comfort, less risk, etc. In order to generate a domain, it is necessary to answer at least 70% of the questions in such domain.¹⁸

Outcome Measures

The following were considered independent outcome measures: 1) sex, 2) age, 3) anthropometric data, measured during the consultation with the patient in his/her underwear. The weight was obtained using TANITA® scales, which record weight in kilograms with a 0.05 kg sensitivity. The height was recorded in centimeters using a Harpenden stadiometer, which has a 0.1 cm sensitivity. The patient had to be barefoot and standing, touching the stadiometer on four points (heels, buttocks, shoulder blades and occiput). BMI: it is defined as the weight in kilograms divided by the square of the height in meters, $BMI = \text{weight}(\text{kg})/\text{height}(\text{m})^2$. 4) Personal history (diseases, allergies, treatments, surgeries). 5) Nutrition-specific follow-up: a 7-day feeding count was performed and verified against the guidelines delivered periodically during the consultation, depending on their weight status. Participants were considered to fail with the guidelines if they had dietary digressions two or more times a day and three or more days a week. 6) The socioeconomic level was measured using the Family Affluence Scale (FAS), which enquires about the presence/frequency of four items:

family car, own room, vacations and computers in the participant's family. The FAS is considered representative to assess the degree of family spending and consumption. Summing up the values of each item denotes a low (0-3 points), middle (4-6 points) or high (7 points or more) socioeconomic level.¹⁹

The domains that code questionnaire questions were considered dependent outcome measures: *satisfaction*, *comfort*, *resilience*, *risk avoidance* and *achievement*.

Statistical Studies

The questionnaires were coded using a consecutive number ordering, ensuring data anonymity and confidentiality.

A descriptive analysis of sociodemographic characteristics was performed for the groups to be compared: normal weight and overweight-obesity.

Categorical outcome measures were compared using Pearson's χ^2 test, while quantitative continuous outcome measures were compared using Student's t test.

A study was done to establish the agreement between the domain scores obtained by parents and their children. The intraclass correlation coefficients (ICC) were estimated with their corresponding 95% confidence intervals (ICC 95% CI). These are displayed using dispersion plots.

A multivariate analysis was done by multiple linear regression of mean domain scores, adjusted by weight status, age, sex and socioeconomic level.

The SPSS v15.0 (Statistical Package for the Social Sciences, Chicago, IL) software for Windows was used.

RESULTS

Eleven of the 167 families invited to participate in the study refused the invitation. Of the 156 families who did agree to take part, 4 were removed because they did not answer enough questions. The final sample was made up of 152 dyads of 7-11 year old male and female children and their parents. Eighty-four participants were classified as having a normal weight, while 68 were classified as having overweight-obesity. The sociodemographic characteristics of the participants are described in Table 1.

In relation to a specific nutritional follow-up, significant differences were identified between the normal weight and the overweight-obesity groups; only 20.6% of children with overweight-obesity stated that they watched what they ate versus 74.3% of the children with a normal weight ($p < 0.001$).

The agreement between parents' and children's perception was medium-low in most domains (ICC < 0.6), both in the overall sample and in the segmented analysis by weight status (Table 2 and Figures 1 and 2). The *Comfort* domain had higher ICCs than the rest (0.73) in the overweight-obesity group; still, the degree of agreement was moderate.

The multivariate analysis of the children version of the survey, adjusted by weight status, age, sex and socioeconomic level, revealed that girls had a lower *Satisfaction* ($p = 0.014$) than boys and that, as they were older, their degree of *Satisfaction* ($p = 0.006$) was lower, both among boys and girls. The *Resilience* domain showed a trend towards statistical significance ($p = 0.054$), with girls scoring lower. However, no significant differences were justified by the weight status (Table 3).

As per parents' perception, participants with overweight-obesity have a lower *Satisfaction* ($p = 0.002$) and a lower *Comfort* ($p = 0.019$); these are significant differences, together with the

trend towards statistical significance found in the *Achievement* domain ($p = 0.052$). In addition, the parents of boys give a statistically significant lower score in the *Risk avoidance* domain ($p = 0.025$) than the parents of girls, which is translated in the fact that the parents of boys believe their children are exposed to higher risks than girls (Table 4).

DISCUSSION

Different studies have assessed the agreement of the answers given by parents and their sick children, with different agreement levels obtained. As per the review conducted by Eiser, et al., parents are capable of making an adequate estimation of their children's HRQoL in relation to physical aspects, but not in terms of social or emotional aspects. In addition, parents of chronically-ill children believe their children's HRQoL is worse than what their children indicate.²⁰ According to the study by Roizen, et al., the correlation of opinions between parents and their ill children is acceptable; however,

TABLE 1. Sample sociodemographic characteristics

	Normal weight	Overweight-obesity	<i>p</i> value
Number	84 (55.3%)	68 (44.7%)	
Sex			
Girls	45 (53.6%)	40 (58.8%)	0.517
Age	9.8 (1.35)	9.7 (1.52)	0.660
Socioeconomic level			
Low-middle	50 (59.5%)	44 (64.7%)	0.513
High	34 (40.5%)	24 (35.3%)	
BMI/SDS*	-0.29 (0.72)	2.2 (0.84)	<0.001

Indicated as number and percentage or mean and standard deviation.

* Number of standard deviations from the mean body mass index (BMI).

TABLE 2. Agreement between parents and children in the different Child Health and Illness Profile questionnaires

	Overall sample		Normal weight		Overweight-obesity	
	ICC	ICC 95% CI	ICC	ICC 95% CI	ICC	ICC 95% CI
Satisfaction	0.464	(0.263-0.611)	0.523	(0.263-0.690)	0.352	(0.048-0.600)
Comfort	0.698	(0.584-0.781)	0.628	(0.427-0.758)	0.733	(0.568-0.835)
Resilience	0.465	(0.263-0.611)	0.399	(0.074-0.610)	0.546	(0.266-0.720)
Risk avoidance	0.474	(0.276-0.618)	0.498	(0.228-0.674)	0.439	(0.093-0.654)
Achievement	0.588	(0.433-0.701)	0.563	(0.330-0.718)	0.598	(0.349-0.752)

ICC: intra class correlation coefficient; ICC 95% CI: 95% confidence interval of the ICC.

FIGURE 1. Graphic representation using dispersion plots of agreement between parents and children with normal weight in relation with HRQoL domains based on the CHIP-CE/PRF and CHIP-CE questionnaires, respectively

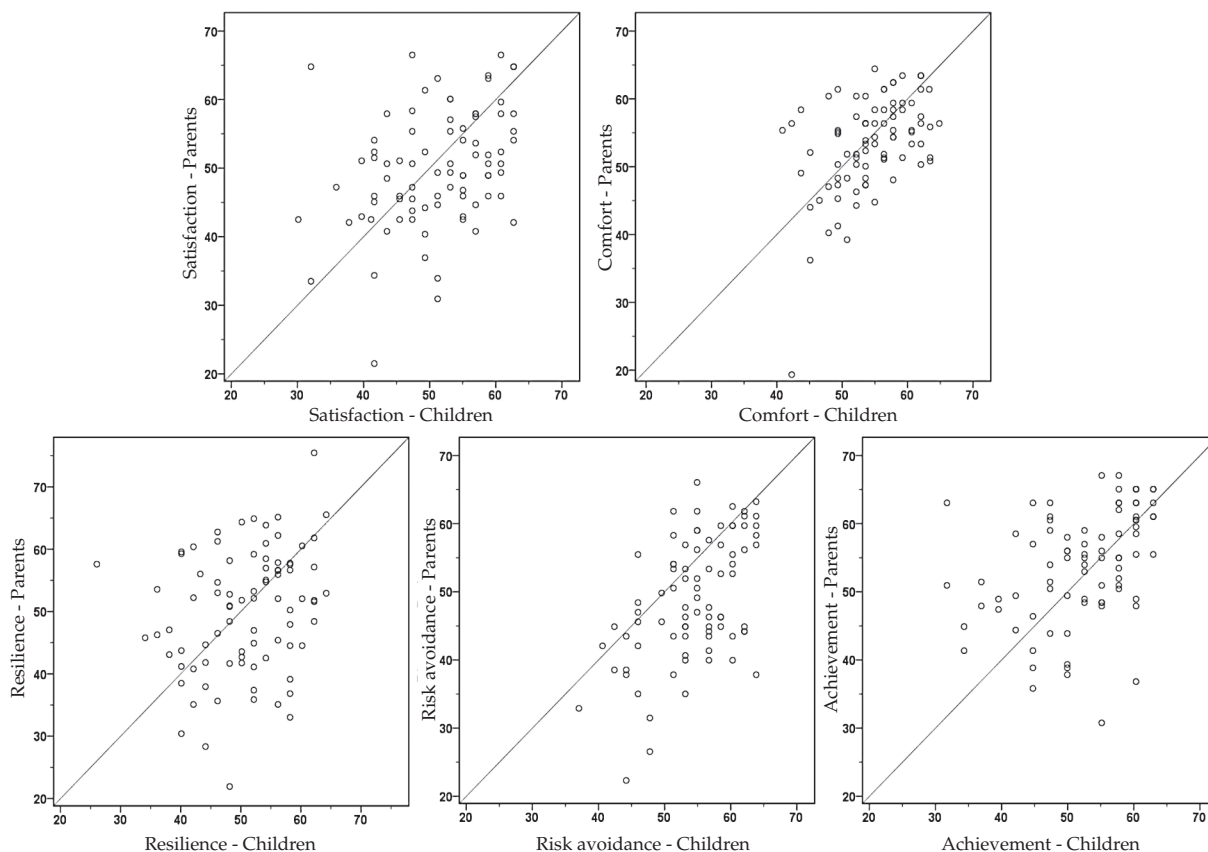


TABLE 3. Scores obtained in the CHIP-CE questionnaire domains based on weight status

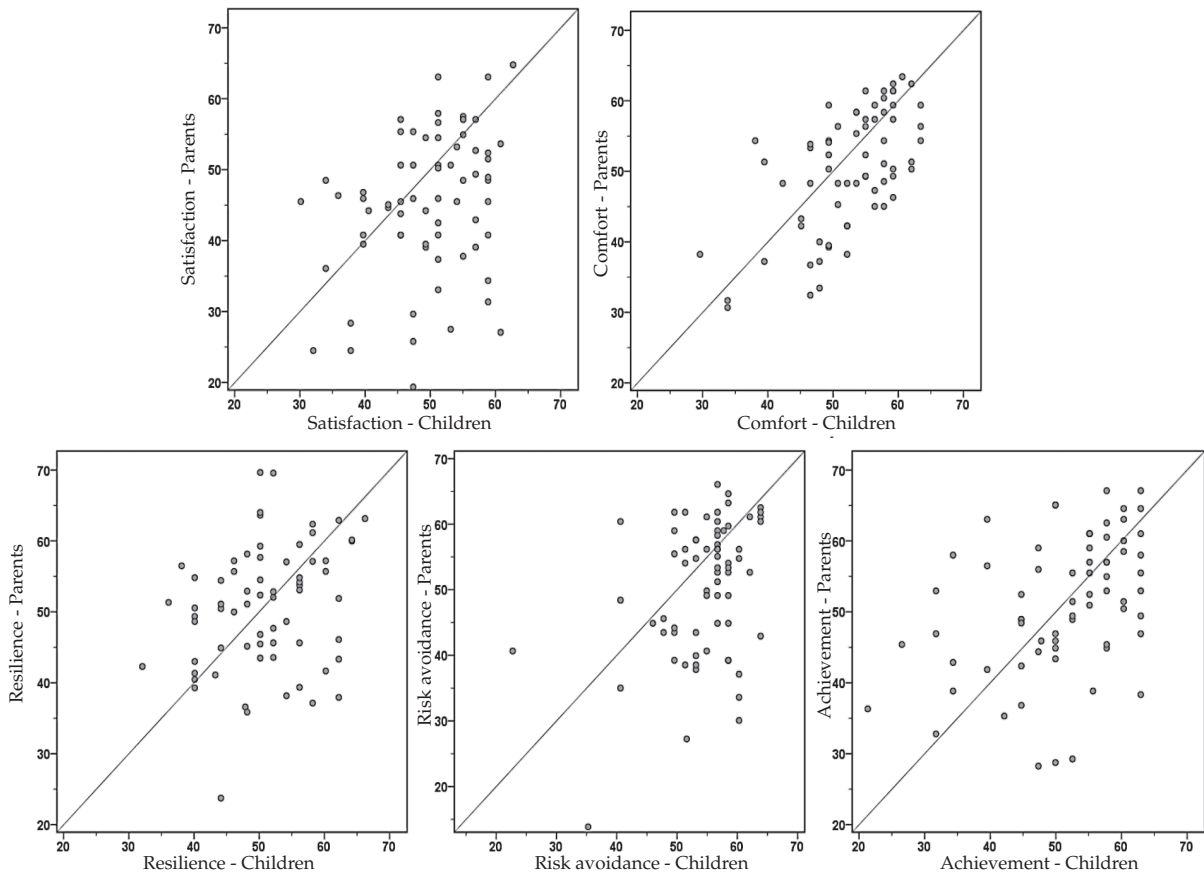
	Normal weight <i>n</i> = 84	Overweight-obesity <i>n</i> = 68	Non-adjusted analysis <i>p</i> value	Adjusted analysis* <i>p</i> value	Significant model for
Satisfaction	51.1 (8)	49.69 (7.77)	0.275	0.325	Sex (female)**
Comfort	54.35 (5.69)	52.48 (7.4)	0.081	0.124	
Resilience	50.74 (8)	50.49 (8.31)	0.851	0.972	
Risk avoidance	54.15 (6.58)	54.46 (7)	0.778	0.886	
Achievement	52.38 (7.87)	51.02 (9.92)	0.35	0.435	

Indicated as mean and standard deviation.

*Adjusted by weight status, age, sex and socioeconomic level.

** The category with the worst score is indicated between brackets. Possible scoring range: -10 to 65.

FIGURE 2. Graphic representation using dispersion plots of agreement between parents and children with overweight-obesity in relation with HRQoL domains based on the CHIP-CE/PRF and CHIP-CE questionnaires, respectively



there is little agreement between patients and their doctors.²¹ The study conducted by Pinhas-Hamiel, et al. reflects that there is an adequate correlation between the scores given by parents and children, and although the difference was not significant, the parents of obese children perceive that their children's HRQoL is worse than what their children indicate.²² In the review made by Tsiros, et al., the conclusion was that parents were capable of estimating their overweight-obese children HRQoL, but always considering that they under-estimate it.²³

Nonetheless, as per the article by Hughes, et al. there is not an adequate agreement between the perceptions of parents and children. Parents of overweight children underestimate their children's HRQoL, while those of normal weight children overestimate it.²⁴ Likewise, Zeller and Modi concluded that there is little agreement between parents and children in terms of

perception, and parents' appreciation is always more negative.²⁵ As per a metaanalysis done by Ul-Haq, et al., patients with overweight have a generally worse HRQoL, especially in relation to physical and psychosocial aspects. Besides, parents overestimate the impact of such weight excess in their children's HRQoL.²⁶

At the time this article was prepared, there were no other similar studies conducted exclusively in Spain. There is a European multicenter study on the impact of overweight on the HRQoL of children and adolescents with a representative sample of 714 Spanish children aged 8-18 years old; said study concludes that overweight and obesity damage the HRQoL, especially in relation to physical comfort and self-perception.²⁷

Results presented in this article indicate that there is a low agreement between parents and children in all the studied domains; agreement

TABLE 4. Scores obtained in the CHIP-PRF questionnaire domains and subdomains based on weight status

	Normal weight		Overweight-obesity		Non-adjusted analysis		Adjusted analysis*	
	n = 84	n = 68			p value	p value	Significant model for	
Satisfaction	49.91 (8.56)	45.11 (10.11)			0.002	0.002		
Satisfaction with health	50.26 (9.22)	44.11 (10.66)			< 0.001	< 0.001		
Self-esteem	49.71 (8.7)	47.06 (10.14)			0.085	0.079		
Comfort	53.32 (7.11)	50.19 (8.52)			0.015	0.019		
Physical comfort	53.2 (7.86)	49.02 (11.07)			0.008	0.009		
Emotional comfort	51.82 (9.02)	48.9 (9.86)			0.059	0.066		
Restricted activity	52.75 (5.43)	52.5 (5.35)			0.777	0.861		
Resilience	50.08 (9.9)	50.2 (9.67)			0.939	0.827		
Family involvement	47.48 (9.8)	49.86 (10.34)			0.148	0.132		
Problem-solving	50.72 (9.34)	51.07 (9.65)			0.819	0.792		
Physical activity	51.58 (9.49)	48.94 (10.54)			0.106	0.149		Sex (female)**
Risk avoidance	48.05 (10.48)	50.51 (10.37)			0.150	0.148		Sex (male)**
Individual risk avoidance	46.65 (10.26)	49.48 (10.56)			0.097	0.092		Sex (male)**
Threats to achievement	50.26 (9.46)	51.46 (8.97)			0.43	0.434		Age (minor)**
Achievement	54.04 (8.27)	51.15 (9.73)			0.049	0.052		
Academic performance	54.42 (8.48)	53.84 (8.49)			0.676	0.713		
Peer relations	51.17(7.87)	45.91(12.02)			0.001	0.001		

Indicated as mean and standard deviation.

*Adjusted by weight status, age, sex and socioeconomic level.

** The category with the worst score is indicated between brackets. Possible scoring range: -10 to 65.

was moderate only in the *Comfort* domain of the overweight-obese group. Consistent with the studies mentioned above, parents give lower scores than children in almost all aspects of the HRQoL. Underestimation is higher when children are overweight-obese. This may be a reflection of the psychosocial stress suffered by parents, who worry about their children's weight status. Excessive concern can lead to overprotection of children, which is harmful for their development and independence.²⁸ Based on all this, it is important to know how children perceive their HRQoL.

Anthropometric measures were recorded at the consulting office by trained personnel, not self-reported.

No BMI borderline values were observed between a normal weight and overweight-obesity, thus ensuring that groups were adequately established.

One of this study's main limitations was that, being a cross-sectional study, only an association can be established, not a causality. In addition, the study used a convenience sample because these subjects can then be proposed for an intervention, but the sample cannot be considered representative of Navarre's pediatric

population. Also, it is not possible to rule out a selection bias because the overweight-obese patients who attend the Endocrinology Division could be especially sensitive to their condition's consequences.

One of the main biases in this study could be the observer bias: when participants know they are being questioned, they tend to give more favorable answers regarding their health status. However, and given that if such bias was not real, differences would be even higher, such confounding factor would not be considered to render the study results invalid.

CONCLUSIONS

Agreement between parents and children in their perception of HRQoL as per the children's weight status was medium-low, with no significant differences observed. As per the parents' perception, the HRQoL of overweight-obese children was significantly lower in terms of health satisfaction, physical comfort and peer relations.

In order to offer patients a comprehensive management, it is necessary to know how they feel about their disease and how it impacts them on a personal level. As long as it is possible, such

subjective information should be obtained directly from the patient. However, parents' perception should not be left out, since it helps to make up a complementary view of the situation. ■

REFERENCES

- Ogden CL, Yanovski SZ, Carroll MD, Flegal KM. The epidemiology of obesity. *Gastroenterology* 2007;132(6):2087-102.
- Sánchez-Cruz JJ, Jiménez-Moleon JJ, Fernández-Quesada F, Sánchez MJ. Prevalencia de obesidad infantil y juvenil en España en 2012. *Rev Esp Cardiol* 2013;66(5):371-6.
- Departamento de Salud del Gobierno de Navarra. Encuesta Nacional de Salud - Navarra 2006. Accessed on: June 14, 2013] Available at: <http://www.navarra.es/NR/rdonlyres/BE60F518-284F-4DF1-BE8F-078C0AEA9CC6/166527/InformeENS2010Navarra1.pdf>.
- Martos-Moreno GA, Argente J. Obesidades pediátricas: de la lactancia a la adolescencia. *An Pediatr (Barc)* 2011;75(1):63.e1-23.
- Daniels SR. Complications of obesity in children and adolescents. *Int J Obes (Lond)* 2009;33(Suppl 1):S60-5.
- Biro FM, Wien M. Childhood obesity and adult morbidities. *Am J Clin Nutr* 2010;91(5):1499S-1505S.
- Gibson LY, Byrne SM, Blair E, Davis EA, et al. Clustering of psychosocial symptoms in overweight children. *Aust N Z J Psychiatry* 2008;42(2):118-25.
- Wille N, Erhart M, Petersen C, Ravens-Sieberer U. The impact of overweight and obesity on health-related quality of life in childhood- results from an intervention study. *BMC Public Health* 2008;8:421.
- Zhang L, Fos PJ, Johnson WD, Kamali V, et al. Body mass index and health related quality of life in elementary school children: a pilot study. *Health Qual Life Outcomes* 2008;6:77.
- Starfield B. Measurement of outcome: a proposed scheme. *Milbank Mem Fund Q Health Soc* 1974;52(1):39-50.
- Urzua MA. Calidad de vida relacionada con la salud: Elementos conceptuales. *Rev Med Chil* 2010;138:358-65.
- Wilson IB, Cleary PD. Linking clinical variables with health-related quality of life. A conceptual model of patient outcomes. *JAMA* 1995;273(1):59-65.
- Ferrández-Longás A, Mayayo E, Labarta J, Bagué L, et al. Estudio longitudinal de crecimiento y desarrollo. Centro Andrea Prader. Zaragoza 1980-2002. En: *Patrones de crecimiento y desarrollo en España. Atlas de gráficas y tablas*. Madrid: Ergon; 2004. Págs.61-115.
- Kuczarski RJ, Ogden CL, Guo SS, Grummer-Strawn LM, et al. 2000 CDC Growth Charts for the United States: methods and development. *Vital Health Stat* 11 2002;246:1-190.
- Johns Hopkins University. Child Health and Illness Profile. A comprehensive assessment of health and functioning for children and adolescents. [Accessed on: June 14, 2013]. Available at: <http://www.childhealthprofile.org>.
- Rajmil L, Serra-Sutton V, Estrada MD, Fernández De Sanmamed MJ, et al. Adaptación de la versión española del Perfil de Salud Infantil (Child Health and Illness Profile-Child Edition, CHIP-CE). *An Pediatr (Barc)* 2004;60(6):522-9.
- Estrada MD, Rajmil L, Serra-Sutton V, Tebe C, et al. Reliability and validity of the Spanish version of the Child Health and Illness Profile (CHIP) Child-Edition, Parent Report Form (CHIP-CE/PRF). *Health Qual Life Outcomes* 2010;8:78.
- Solans M, Pane S, Estrada MD, Serra-Sutton V, et al. Health-related quality of life measurement in children and adolescents: a systematic review of generic and disease-specific instruments. *Value Health* 2008;11(4):742-64.
- Currie C, Molcho M, Boyce W, Holstein B, et al. Researching health inequalities in adolescents: the development of the Health Behaviour in School-Aged Children (HBSC) family affluence scale. *Soc Sci Med* 2008;66(6):1429-36.
- Eiser C, Morse R. Can parents rate their child's health-related quality of life? Results of a systematic review. *Qual Life Res* 2001;10(4):347-57.
- Roizen M, Figueroa C, Salvia L y miembros del Comité de Calidad de Vida y Salud. Calidad de vida relacionada con la salud en niños con enfermedades crónicas: comparación de la visión de los niños, sus padres y sus médicos. *Arch Argent Pediatr* 2007;105(4):305-13.
- Pinhas-Hamiel O, Singer S, Pilpel N, Fradkin A, et al. Health-related quality of life among children and adolescents: associations with obesity. *Int J Obes (Lond)* 2006;30(2):267-72.
- Tsiros MD, Olds T, Buckley JD, Grimshaw P, et al. Health-related quality of life in obese children and adolescents. *Int J Obes (Lond)* 2009;33(4):387-400.
- Hughes AR, Farewell K, Harris D, Reilly JJ. Quality of life in a clinical sample of obese children. *Int J Obes (Lond)* 2007;31(1):39-44.
- Zeller MH, Modi AC. Predictors of health-related quality of life in obese youth. *Obesity (Silver Spring)* 2006;14(1):122-30.
- Ul-Haq Z, Mackay DF, Fenwick E, Pell JP. Meta-Analysis of the Association between Body Mass Index and Health-Related Quality of Life among Children and Adolescents, Assessed Using the Pediatric Quality of Life Inventory Index. *J Pediatr* 2013;162(2):280-6.e1.
- Ottova V, Erhart M, Rajmil L, Dettenborn-Betz L, Ravens-Sieberer U. Overweight and its impact on the health-related quality of life in children and adolescents: results from the European KIDSCREEN survey. *Qual Life Res* 2012;21(1):59-69.
- Friedlander SL, Larkin EK, Rosen CL, Palermo TM, Redlines S. Decreased quality of life associated with obesity in school-aged children. *Arch Pediatr Adolesc Med* 2003;157(12):1206-11.