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## Research Article

### QUALITY OF LIFE AND NUTRITIONAL STATUS, CONCORDANCE ABOUT MOTHER-CHILD DYADS IN THE SOUTHEAST OF MEXICO

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#### ABSTRACT

**Objective:** Determine concordance and correlate nutritional status and quality of life of mothers and children, as well as to identify of the Body Mass Index influence on perception of quality of life from mothers and children. **Material and Methods:** Descriptive correlational design in a sample of 183 mother-child dyads. Two instruments were used: 1) Sizing me up and 2) Sizing them up. **Results:** The results revealed that the nutritional status in children was 19.1% overweight and 32.8% obese, and 41% of mothers were obese. Linear regression generally shows that mothers contribute to the assessment made by children of the overall quality of life, thus explaining 69.4% of the variance. **Conclusion:** Mothers underestimate the quality of life of their children and are not able to objectively interpret the situations that affect the quality of life perceived by their children.

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#### INTRODUCTION

Obesity (OB) is a chronic illness which, because of its high and growing prevalence, needs to be thought as a public health problem requiring priority attention. Being a multifactorial illness, OB can only be understood through a biopsychosocial approach. Even though OB can be easily identified, it is difficult to define psychologically (Vázquez, 2004).

Overweight (OW) and obesity (OB) have become two of the most frequent nutritional disorders worldwide. The incidence and prevalence of these disorders have progressively and significantly increased in recent years. There are reports of a combined prevalence of OW and OB in children 5-11 years of age of 34.4% at national level (Gutierrez, et al. 2012). In general, these disorders begin during childhood and adolescence as a consequence of an imbalance between food intake and energy usage. Several genetic and environmental factors are involved at their onset. These factors determine a metabolic disorder that leads to an excessive accumulation of body fat when compared to the expected value based on gender, size and age, which can be harmful for the individual's health (Arellano, et al. 2004; Islas & Peguero, 2006). Both OW and OB have serious consequences on health. The risk increases as the BMI increases, which in turn becomes an

important risk factor for chronic illnesses such as: cardiovascular illnesses, diabetes, high blood pressure, locomotor system illnesses, dyslipidemia, hyperinsulinemia, insulin resistance, besides some types of cancer, among others. On the other hand, childhood OB has been associated with a higher probability of premature death and disabilities in adult age (WHO, 2013).

The study of the quality of life in children comprises several domains of subjective experience: physical abilities, psychological wellbeing, social interaction and academic performance (Hughes, Farewell, Harris & Reilly, 2007; Pinhas, et al., 2006). Thus, the quality of life related to health is an important subjective measurement of an individual's condition and aims to reflect the impact of illness on the individual and the sense they about the condition of their own general health, and becomes a useful tool that characterizes the overall load of the illness (Pinhas, et al., 2006; Monés, 2004).

For the purpose of this study, the quality of life is defined as the individual experience perceived in several dimensions, physical, emotional and social, and it was measured using the Sizing me Up (Zeller & Modi, 2009) and Sizing them Up (Modi & Zeller, 2008) instruments, which were developed to

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measure the quality of life of 5 to 13 years of age children. There is a children's version and a parent's version.

The studies on quality of life have been carried out mostly with adults. In a study whose objective was to relate the concepts of empowerment, stress with the illness, self-care, glycemic control and health as they relate to the quality of life, it was found that empowerment had a significant influence on the aspects of satisfaction of the quality of life related to health (QLRH). Self-care had a significant influence on the satisfaction, impact and concern with QLRH. The glycosylated hemoglobin test showed a negative and significant relationship regards to satisfaction and QLRH (Hsia, Chu & Yueh, 2011). Other studies have reported that the total assessment of the quality of life, and the psychosocial and physical dimension were significantly lower in obese children when compared with overweight children ( $p < .05$ ) (Warchburger, 2005; Cuervo & Carreazo, 2006)

On the other hand, it has been shown that the quality of life related to health in overweight and obese children is less favorable than in normal weight children (Warchburger, 2005; Cuervo & Carreazo, 2006) and the same is true when compared with the quality of life of children with cancer. These studies mention that the quality of life is progressively affected as the BMI increases (Wille, Erhart & Ravens, 2008). It has also been shown that parents of obese children perceive the quality of life of their children is lower than the children's self-perception (Pinhas, et al., 2006).

Considering that school age is a crucial stage for the development of eating habits and other healthy life styles, which will remain with them at later stages, and since childhood obesity is a predictive factor for adult obesity, the importance of this study is to explain the quality of life and the nutritional state of a population of school children and their mothers residing in the State of Tabasco; a phenomenon that has not been studied in depth for this specific population.

For that reason, the objective of this study was to determine and correlate the nutritional state and the quality of life of mothers and children, as well as to identify the influence of Body Mass Index on the perception of quality of life of mothers and children.

## MATERIALS AND METHODS

The design of this study was descriptive, correlational. The population of interest consisted of mothers and their children 6-13 years of age, of both genders, apparently healthy and enrolled in two urban elementary schools located in the State of Tabasco, in the south of Mexico. The schools were randomly selected from the total of 136 schools registered in the same zone. A sample of 183 children was chosen from the two selected schools for unrestricted sampling and included students from 1<sup>st</sup> to 6<sup>th</sup> grade of elementary school as well as the mothers who gave their authorization to participate in the study. Children with endocrine or metabolic illnesses that had been previously diagnosed, such as hypothyroidism, diabetes mellitus, kidney disorders, Cushing syndrome, girls with polycystic ovaries, children who were being treated with steroids, or illnesses such as cancer, were excluded from the study since these patients were receiving therapeutic treatments

with severe secondary effects that could alter their quality of life and nutritional status. These exclusion criteria were verified through direct questions asked to the mothers.

After the Principals of the two elementary schools that were selected authorized the study, and after obtaining the written consent from each mother after we explained the purpose, benefits, risks, and procedures related to the study, we proceeded on and asked for sociodemographic information, took anthropometric measurements, and then applied the instruments to assess the quality of life; Sizing me Up, version for children 5 to 13 years of age (Modi & Zeller, 2009) and Sizing them Up, version for mothers of children 5 to 18 years of age (Zeller Modi, 2008).

For the measurement of sociodemographic variables, we used an identity card and asked for information about the child's age in years, gender, years of education, family background regarding obesity and chronic illnesses in first-degree relatives, and the presence of risk factors for the development of chronic illnesses in first-degree relatives. The nutritional status of the children was determined using the current tables for growth and development from the National Center for the Prevention of Chronic Illnesses and the Promotion of Health (National Center for Health Statistics, 2000). The Body Mass Index (BMI) was calculated using the weight and size of each participant ( $\text{weight}/\text{size}^2$ ), the Waist Hip Index (WHI) was obtained from the perimeter of the waist (cm)/perimeter of the hip (cm) using a measuring tape marked in millimeters, with the patient standing up and both arms relaxed, hanging on both sides of their body. The perimeter of the waist is the minimum circumference between the lower costal edge and the iliac crest; the perimeter of the hip is the maximum circumference between the waist and the thighs.

Weight measurements were done using a Tanita BC-418 Model 2204 scale. The weight was measured having the person without shoes, standing on the central base of the scale; the reading was recorded in kilograms and grams. Size: was the maximum distance between the base of the scale and the vortex (the highest point of the head). It was measured having the patient standing up, completely straight, without shoes, keeping the heels together, the arms hanging on the sides of their body, with their back towards the ruler. The reading was reported in meters and millimeters.

The following instruments were used to measure the quality of life of school-age children: Sizing me up (Modi & Zeller, 2009) and Sizing them up (parent's version) (Zeller Modi, 2008). These instruments specifically measure the quality of life of children for the age range of the population being studied. These questionnaires were provided by the authors with their authorization to translate them into Spanish. The forward and back translation procedures of the instruments were followed.

The Sizing me up (Modi & Zeller, 2009) instrument is a version administered through an interview of school-age children between 5 and 13 years of age. The Sizing them up (Zeller Modi, 2008) instrument is a questionnaire that is self-administered by parents of children between 5 and 18 years of age. These two instruments consist of 22 questions each, divided into 6 sections: physical performance and

uncomfortableness, academic performance, emotional performance, relationships between classmates, mocking/victimization and social isolation. The answers range from 1 = Never to 4 = Always; the score is from 22 to 88 points. The addition of the points of each instrument is transformed to 100, which represents the best quality of life. The reliability coefficients (Cronbach's Alpha) of these instruments are .81 and .88 respectively. It is important to mention that before making any measurement and doing the study procedure, the study was submitted for evaluation to the Research Committee of the University and was assigned the following code: UJAT-2008-C04-11; it was carried out in accordance with the ethical standards of the Regulation of the General Law of Health Regarding Health Research in Mexico. The analysis of the data was done using the IBM SPSS V22.0. The significance level for all statistical tests was equal to or less than .05. The following concepts were used: descriptive statistics, mean, median, standard deviation, frequency distribution, *t* of student, Spearman correlation, simple linear regressions, and probability ratio in the EPI'S ODDS statistical package, using the test for odds ratio and taking the number of subjects with normal weight as reference and comparing them with the three remaining categories of the Body Mass Index, which are low weight, overweight and obesity.

**RESULTS**

The sample consisted of 183 students and their mothers; 44.3% of the students (*n* = 81) were males and 55.7% (*n* =102) were females; their average age was 8.2 years (*SD*= 2.0, 5 – 13 years). Among the mothers, 62.8% had finished Elementary School; 88.5% were married; 31.7% had a record of diabetes and hypertension, 27.9% were obese; the average BMI of the mothers was 29.4 (*SD* = 4.8; 19 – 45).

Regarding the general nutritional status, 3.8% of the students had low weight, 44.3% normal weight, 19.1% overweight and 32.8% were obese. The probability of risk for the students to be obese is 2.11 [1.10 – 4.05], the global observed risk shows a trend for significance  $\chi^2 = 7.50$ ; *p* = .06.

The quality of life, QOL, of the Sizing me Up instrument (children's version) and Sizing them Up (parent's version) reported Cronbach's Alpha of 0.87 and 0.88 respectively. The QOL perceived by children was generally bad (72.7%; *n* = 133). A higher percentage of girls perceived the quality of life as bad (74.5%) (Table 1).

**Table 1** Children's perception of quality of life by gender.

Quality of Life	Males		Females		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Bad	57	70.4	76	74.5	133	72.7
Good	24	26.6	26	25.5	50	27.3
$\chi^2 = 0.21, \text{gl} = 1, p > .05$						

Table 2 shows the differences between the perceptions of quality of life of the children and mothers; they were observed with the *t* of student test in the common dimensions of both instruments; significant differences were found between the perceptions of children and mothers (*p* < .001); it is worth noting that in the dimension of positive attributes, the negative sign of the statistical *t* = – 6.9 indicates that the perceptions of the mothers regarding the positive attributes of their children are significantly higher than those perceived by the children

themselves, which is different in the other dimensions where the average scores of the mothers are lower than those of the children.

**Table 2** Differences in the dimensions of quality of life perceived by mothers-children dyads.

Dimensions	Mothers		Children		<i>t</i> (182)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Emotional Performance	18.9	20.6	52.2	18.2	29.1*
Physical Performance	18.8	17.5	53.7	18.3	37.1*
Positive Attributes	37.9	24.9	27.2	14.1	-6.9*
Mocking / Marginalization	19.3	20.8	51.4	17.9	26.4*
Total Quality of Life	23.5	17.1	46.3	14.0	32.6*

Note: *M* = Mean, *SD* = Standard Deviation, \* *p* < .05

Table 3 indicates the observed risk of the students' nutritional status and the quality of life perceived. A higher risk of perceiving a bad quality of life was observed in children with overweight [*OR* = 1.25; 0.61 – 2.57] and obesity [*OR* = 2.50; 1.36 – 4.58] than in children with normal weight, even though the results for global risk were not significant ( $\chi^2 = 5.78$ ; *p* < .05).

**Table 3** Quality of life perceived by the students based on the nutritional status.

Nutritional Status	Quality of Life				OR	IC 95%	Total	
	Good		Bad				<i>f</i>	%
	<i>n</i>	(%)	<i>n</i>	(%)				
Normal	27	54.0	54	40.6	1.00	Reference	81	3.8
Low	3	6.0	4	3.0	0.67	0.15-2.87	7	44.3
Overweight	10	20.0	25	18.8	1.25	0.61-2.57	35	19.1
Obesity	10	20.0	50	37.6	2.50	1.36-4.58	60	32.8
$\chi^2 = 5.78, \text{gl} = 3, p > .05$								

Regarding the mothers' nutritional status, only 14.8% showed normal weight, 44.3% overweight and 41% some degree of obesity.

Table 4 shows the concordance of quality of life (QOL) between mothers and children; worth noticing is that the perception of bad QOL coincides within the dyad; the agreement observed of 92.3% with the statistical Kappa is excellent and significant *p* < 0.01.

**Table 4** Concordance of quality of life perceived by mothers and children.

Children	Mothers			Kappa	SE
	Good	Bad	Observed Concordance		
Good	41	9	0.9235	0.8024	0.0504
Bad	5	128			
$Z = 10.87; p < .05$					

SE= Standard Error

Regarding the relationship between the dimensions of the quality of life instruments, both the versions for children and mothers, using the Spearman correlation test, show results with significant positive relationships (*p* < .05) between the dimensions of quality of life. The strongest relationships were observed in the Physical Performance (*r* = .747), Emotional Performance (*r* = .709), Mocking/Marginalization (*r* = .651) dimensions.

In order to expand the analysis, linear regression tests were applied to the common dimensions of the instruments of quality of life between mothers and children with the purpose

of to determine how much the mothers' perception affects the dimensions of quality of life perceived by their children; the results are significant ( $p < .05$ ) indicating that there is a significant linear relationship between the perceptions of mothers and children regarding general QOL. By dimensions, the variance explains 47.2% of the emotional performance, 55.5% of the physical performance, 24.9% of positive social attributes, 42.1% of mocking and/or marginalization and 69.4% of general quality of life. The variance explains the contribution of the perception of quality of life by the mother on the general QL of her children (Table 5).

**Table 5** Degree of contribution of the perception of quality of life of mothers and children dyads

Dimensions of the Quality of Life	B	EE	$\beta$	p
Emotional Performance	.608	1.33	.689	.000
Physical Performance	.778	0.52	.747	.000
Positive Social Attributes	.293	.037	.503	.000
Mocking / Marginalization	.559	.048	.651	.000
General Quality of Life	.686	.034	.834	.000

## DISCUSSION

The BMI results in the mothers and children sample indicate that there is a high prevalence of the overweight and obesity combination among the two populations, higher than the national average as reported in the 2012 National Survey on Health and Nutrition for similar populations; in school age children, the prevalence found was of 53.5% vs 34.4%, 19 percentage points (pp) higher than the reported national prevalence, and in adults (taking the results for females because in this study they represent more than 90% of the sample), the prevalence of overweight and obesity in women was 78% vs 73% of the reported national prevalence for adult populations, 5pp higher (Gutierrez, et al., 2012). This makes the overweight and obesity problem in our country even more alarming, because as children have close interaction with close relatives who have overweight and obesity problems, that could perpetuate their nutritional state under said conditions with the inconveniences of developing chronic illnesses, among others (Williams, Wak & Hesketh, 2005) in the future. In the sample of our study, there is a family background of obesity, diabetes, dyslipidemias, cardiovascular diseases and osteoarthritis, which could increase health risks for the students. It is important to considerate of education level, especially of the mothers, since most of them only went through elementary education, which is perceived as an indication of a limited understanding of the overweight and obesity phenomenon, its implications for their health, the best strategies to fight it and the modification of family life styles. Regarding this, other authors (Abitol & Rodriguez, 2009; Rajmil, López & Mompert, 2011; Taylor, Wilson, Slater & Mohr, 2011) have found that the mother's level of education and some behaviors and habits are associated with their children's overweight and obesity conditions. The children's quality of life can be affected by overweight and obesity. In this study, the quality of life perceived by school age children had low scores, independently from the nutritional state, including those with normal weight. When the proportions of children with overweight and obesity are combined, the low scores for quality of life increase in this group. However, the scores of the mothers' perception regarding the quality of life of their children are even lower,

which could indicate that the mothers underestimate some of their children's abilities and have a wrong perception of their quality of life; this can be also caused by cultural aspects inherited by the mother. This finding is consistent with reports from other authors (Hughes, Farewell, Harris & Reilly, 2007; Moreira, Cabral, Ferreira & Lira, 2012; Moreira, et al., 2013; Tsiros, et al., 2009) who coincide that the parents' scores are different from their children, and that in their results, parents tend to perceive a worse quality of life in their children; they assume that the child's perspective is due to a more recent or immediate vision and that parents see it from a wider perspective. Another possible explanation for this finding is that it is due to the perception of the mothers, who could respond based on their own experience because the BMI corresponds to overweight and obesity problems. Other evidence indicates that children of obese parents are more likely to be obese than children of normal weight parents (Moreira, Cabral, Ferreira & Lira, 2012) and that the environment of an obesogenic family can make it more difficult for parents to understand the reasons for their children's elevated weight, their own health and the general wellbeing of their children (Ul-Haq, Mackay, Fenwick & Pell, 2013).

Regarding the relationships of quality of life by dimensions, they are usually weak relationships; the most remarkable relationship is the perception of positive social attributes; this finding is consistent with previous studies where has been reported that overweight and obese children are more likely to primarily experience social problems (Abu, et al., 2008). In the dimension of positive attributes from the children's perspective, the result was not strong enough to associate it; this may suggest that children with higher BMI have difficulties in establishing social relationships with other classmates, probably because they are subject of mocking or marginalization, since this dimension is also one of the dimensions with the highest score, but in a negative way. In this sense, some authors claim that school age children are more likely to be victims of intimidating behaviors, mocking or bullying, which can significantly affect their psychosocial health (Hughes, Farewell, Harris, & Reilly, 2007; Storch, et al., 2007; Janssen, Craig, Boyce & Pickett, 2004; Puhl & King, 2013).

## CONCLUSIONS

The prevalence of overweight and obesity in a population of school age children and their mothers in the State of Tabasco was higher than the prevalence reported in the 2012 National Survey on Health and Nutrition, in both children and adults, with higher values among females.

The perception of quality of life of children and mothers had significant differences. Mothers perceive a worse quality of life in their children than the children themselves. Mothers underestimate the quality of life of their children and are not able to objectively interpret the situations that affect the quality of life as perceived by their children. The most affected dimension is the assessment of the positive attributes. Both mothers and children reported low scores. In children, being exposed to mocking and discrimination, may affect the assessment of their own positive attributes.

The BMI affects the perception of the quality of life of children and parents. The greater the BMI, the more unfavorable the perception of quality of life is. These data provide a better understanding of the perception of quality of life in this population and suggest possible guidelines for the development of interventions that would lead to the improvement of nutritional conditions of school aged children, the general quality of life, and future health conditions of the children.

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