ORIGINAL ARTICLE

Parental perception and childhood obesity: Contributors to incorrect perception

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Abstract

Objectives: To determine parental recognition of their child's weight, and to identify the contributing reasons for incorrect perception.

Method: This cross-sectional study was conducted from April to October 2010 at Aga Khan University Hospital, Karachi, and comprised parents of healthy children aged 5-14 years. An interviewer-based pre-tested questionnaire consisting of socio-demographic details, anthropometric measurements, and parental perception about their child's weight was administered. Data was analysed using SPSS 21. Both univariate and multivariate logistic regression were applied to assess for the risk factors associated with incorrect parental perception.

Results: Parents of a total of 330 eligible children were approached, but 305(92.4%) agreed to participate. Of them, 196(64.3%) were mothers and 109(35.7%) were fathers. Overall, 179(58.7%) parents incorrectly perceived their child's weight status. On univariate regression analysis, age (p=0.001) and body mass index of the child (p=0.006) and parental occupation (p=0.018) were significant risk factors of incorrect perception.

Conclusion: Marked difference was observed between measured and perceived weight of children by the parents.

Keywords: Childhood obesity, Overweight, Parents, Father, Mother, Perception. (JPMA 67: 214; 2017)

Introduction

Globally, the prevalence of childhood and adolescent obesity is increasing rapidly in both the developed and the developing world.[1,2] An estimated 170 million children (aged <18 years) are considered to be overweight worldwide and in some countries the rise has been substantial since 1980.[3] It is estimated that in developing countries, the prevalence of overweight and obesity in children and adolescents between 1980 and 2013 has increased from 8.1% (7.7-8.6) to 12.9% (12.3-13.5) for boys and from 8.4% (8.1-8.8) to 13.4% (13.0-13.9) in girls.[4] In a study conducted in Karachi, Pakistan, the prevalence was found to have risen from 3.0% to 5.7% in 5-14 year old children[5] over a period of 10 years.

This epidemic of obesity in childhood has become an important health concern because it increases the risk of obesity and its related disorders like type 2 diabetes mellitus (T2DM), metabolic syndrome (MS), high blood pressure (BP), asthma, early puberty, eating disorders and depression in later life.[6,7] Moreover, in countries still struggling with malnutrition and micronutrient deficiencies, there has been a considerable rising trend in childhood obesity and its metabolic consequences.[8]

One of the essential shapers of childhood behaviour is parenting style. It has been proven that parents are influential in shaping early eating and physical activity patterns in their children.[9] Weight perception has been implicated to be a key element in defining the relationship between weight status and managing weight control.[10] Parents who perceive their child as overweight are more likely to make lifestyle changes and help their child lose weight than the parents who do not perceive their child to be overweight.[11-13] In a systematic review, the parental misperception of overweight seemed to be universal with approximately 63.4% parents failing to recognise their child being overweight.[14]

There is a complex interaction of various factors contributing to parental misperception, hence encouraging an obesogenic environment. It has been documented that parental obesity has been associated with increase in child's adiposity, as well as incorrect assessment of their child's weight.[15-18] Other factors contributing significantly to parental misperception identified in many studies include being parents of a male child,[12] parents of Caucasian children,[12,16,19] and parents of very young children.[20,21] Higher education level is significantly associated with more accurate perceptions of child's weight.[18,22]

For parents to actively engage in obesity prevention efforts with their children, they must be aware that their child is overweight and must be concerned about the potential consequences. Generally, as overweight children are considered healthy, the parents of normal weighing children consider their children to be underweight,[11-13] and, hence, modify their dietary and lifestyle patterns to increase their weight. If this general

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perception also holds true in Pakistan, it would put an added burden to an already existing epidemic of childhood obesity. Measures would need to be undertaken to motivate not only the parents of overweight, but also of normal weighing children to increase healthy lifestyle habits. In Pakistan, little is known about how parents perceive their child's weight as well as the risk factors associated with misperception, if any. As a first step towards obesity prevention, it is necessary to also identify factors associated with incorrect weight perception among parents.

The current study was planned to assess whether parents correctly recognise their child's overweight status in children with body mass index (BMI) $\geq$ 3rd percentile or not, and to identify the contributors to incorrect perception.

Subjects and Methods

This cross-sectional study was conducted from April to October 2010 at Aga Khan University Hospital, Karachi, and comprised parents of healthy children aged 5-14 years with a BMI above the 3rd percentile. The subjects were enrolled from the outpatient Family Medicine and Paediatrics clinics. Parents of children with known pathological obesity, as reported by parents, were excluded.

The sample size was calculated on the basis of prevalence of 45% about parental misperception of their child's weight.[13] By using the World Health Organisation (WHO) software, the estimated sample size was 265 with a bound on error of 6% and a confidence interval (CI) of 95%. After addition of 15% for non-response rate, the final sample size was 305. Sampling strategy used was non-probability convenience.

The study protocol was approved by the institutional ethics review committee. Standard measures were taken to ensure the confidentiality of participants. The study participants were provided with a consent form in Urdu, detailing the aims of the study, methods, the anticipated benefits, the right to refuse, voluntary participation and the right to withdraw without any effect on the clinical care.

After extensive literature search,[12,15-22] a structured questionnaire was developed in English based on the objectives of the study. The questionnaire consisted of three parts: socio-demographic details (age of child, gender of child, age of parent, educational status of parents, occupation, and average monthly income of the family), anthropometric measurements(child's weight and height for calculating BMI, self-reported parental weight and height for calculating BMI), and parental perception about their child's weight status. The questionnaire was translated to Urdu and then back-translated to English. It was then piloted on a small number of patients to check for any inconsistencies.

For children, height (in metres) and weight (in kilogrammes) was measured in light indoor clothes, without shoes, using a calibrated anthropometric scale. To classify the children, the WHO criteria for growth charts 2007 were used, which defined normal weight as between the 3rd percentile and 85th percentile for BMI-for-age, overweight as between the 85th percentile and 97th percentile for BMI-for-age, and obese as at or above the 97th percentile of BMI-for-age.[23] BMI was calculated using the standard formula. The parent's weight and height were self-reported. Overweight was categorised as BMI >23 kg/m^2 in line with WHO recommendation.[24]

Parent's perception regarding their child's weight was assessed by the question that has been used by a number of international studies for the same purpose.[11,12,21] "I feel that my child is a) underweight, b) slightly underweight, c) about the right weight, d) overweight, and e) obese".

Data was double-entered and analysed using SPSS 21. Mean and standard deviation (SD) were calculated for age and monthly income. Frequency and percentage were calculated for gender, ethnicity, maternal and paternal educational status, relationship of the accompanying parent to the child, children in different BMI categories, and children in different weight categories according to their parent's perception.

For the purpose of analysis, parent's recognition was categorised into two categories: a) Incorrect recognition (parents who recognised their child's weight incorrectly in both normal weight and overweight groups was combined); and b) Correct recognition (parents who recognised their child's weight correctly in both normal weight and overweight groups was combined). Stratification was done with regards to age, gender, parental education, and income to see the effect of these on the outcome. For measuring association of parental recognition with independent categorical variables, Pearson Chi-square/Fisher Exact/Likelihood ratio, Chi-square tests were used as appropriate.

Both univariate and multivariate logistic regressions were applied to assess risk factors associated with incorrect perception of parents. All the factors that were found to be significantly associated in univariate analysis and those known to be significantly associated with incorrect parental perception in the literature were included in

multivariate analysis. All of the analyses were two tailed, and p<0.05 was considered significant.

Results

Parents of a total of 330 eligible children were approached, but 305(92.4%) agreed to participate. Of them, 196(64.3%) were mothers and 109(35.7%) were fathers. Overall, 141(46.2%) participants belonged to Urdu-speaking families followed by other ethnicities. Fathers in 240(78.7%) cases were more qualified than mothers 154(50.5%). In terms of income, 148(48.5%) households had income ranging from Rs.21,000 to Rs.40,000. Professionally, 242(80%) mothers were housewives whereas 109(35.7%) fathers were self-employed (Table-1).

The mean age of the children was 8.4±2.7 years; 148(48.5%) were girls; 256(83.9%) had normal weight; 23(7.5%) were overweight; and 26(8.5%) were obese.

Of the total, 179(58.7%) parents incorrectly perceived their child's weight status. Besides, 138(54%) of the parents of normal weighing children, 18(78%) of the parents of overweight children, and 21(81%) of the parents of obese children wrongly classified their child's weight status (Figure).

Risk factors for incorrect perception of weight

The factors contributing to the incorrect perception of parents regarding weight in children are presented in Table-2. All the factors that were found to be significant in univariate analysis were included in multivariate analysis.

In univariate regression model, age and BMI of the child

Table-1: Socio-demographic characteristics.

	Frequency (N=305)	Percentage (%)
Ethnicity		
Punjabi	42	13.8
Sindhi	42	13.8
Balochi	4	1.3
Pathan	14	4.6
Urdu Speaking	141	46.2
Other	62	20.3
Mother's Education		
Illiterate	13	4.3
Intermediate or below (≤12 years of formal education)	154	50.5
Above intermediate (>12 years of formal education)	138	45.2
Father's Education		
Illiterate	4	1.3
Intermediate or below (≤12 years of formal education)	61	20.0
Above intermediate (>12 years of formal education)	240	78.7
Total monthly income		
<=20,000	51	16.7
21,000-30,000	68	22.3
31,000-40,000	80	26.2
41,000-50,000	48	15.7
50,000+	58	19.0

Table-2: Univariate logistic regression.

-	Incorrect recognition[a]		Multivariate Incorrect recognition[a]	
	OR (95% CI)	P-value	OR (95% CI)	P-value
Age groups				
<8 years	2.20 (1.38-3.51)	0.001*	2.28 (1.40-3.71)	0.001*
≥8 years	ref	ref		
Child's gender				
Male	ref	-	-	
Female	1.12 (0.71-1.77)	0.618	-	-
Relation to the child				
Father	ref	-	-	
Mother	1.26 (0.79-2.03)	0.336	-	-
Ethnicity				
Punjabi	0.52 (0.24-1.16)	0.112	-	-
Sindhi	1.54 (0.68-3.48)	0.297	-	-
Balochi	0.771 (0.10-5.83)	0.802	-	-
Pathan	0.31 (0.09-1.09)	0.068	-	-
Urdu speaking	1.49 (0.81-2.75)	0.197	-	-
Other	ref	Ref		
Parental BMI				
Underweight	4.37 (0.51-37.66)	0.179	4.7 (0.53-41.47)	0.164
Overweight/obese	1.01 (0.62-1.64)	0.958	0.83 (0.49-1.39)	0.475
Normal	ref	Ref		
Child's BMI				
Overweight	5.7 (1.65-19.66)	0.006*	7.18 (2.02-25.47)	0.002*
Obese	3.59 (1.31-9.82)	0.013*	3.88 (1.39-10.80)	0.010*
Normal	ref			
Mother education				
Illiterate	ref	-	-	
Intermediate or below	1.83 (0.59-5.7)	0.299	-	-
Above intermediate	1.56 (0.49-4.89)	0.444	-	-
Father education				
Intermediate or below	ref	-	-	
Above intermediate	0.91 (0.51-1.61)	0.742	-	-
Total monthly income	1	0.525	-	-
Father occupation				
Businessman	0.61 (0.36-1.03)	0.065	-	-
Doctor	0.38 (0.06-2.39)	0.305	-	-
Engineer	0.98 (0.45-2.21)	0.952	-	-
Banker	1.01 (0.45-2.24)	0.981	-	-
Others(specify)	ref	-	-	
Mother occupation				
Housewife	ref	ref		
Doctor	0.26 (0.07-1.02)	0.053	-	-
Teacher	5.99 (1.35-26.49)	0.018*	-	-
Others (specify)	0.75 (0.36-1.55)	0.436	-	-

[a]: Correct perception is the reference group.
*p-value <0.05.
BMI: Body Mass Index.

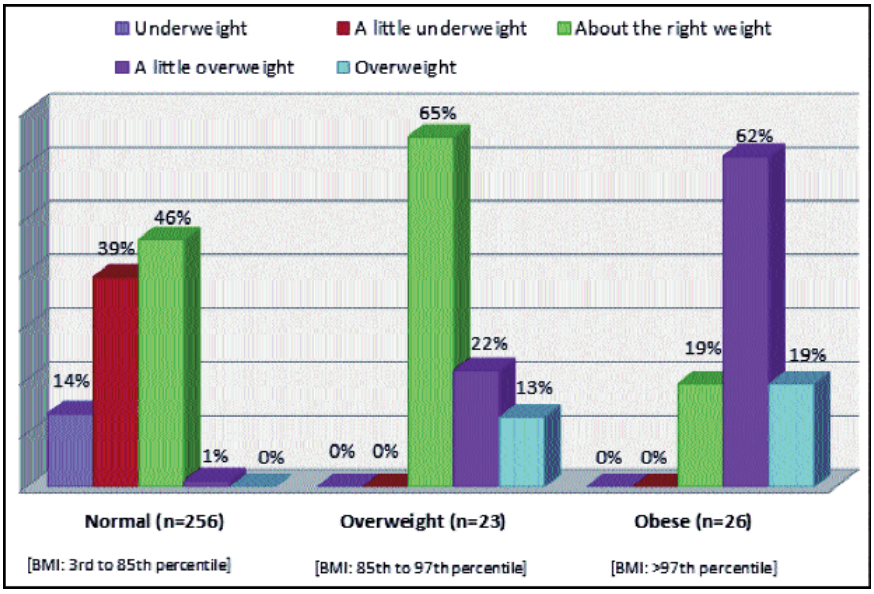

Figure: Parental weight perception compared with calculated BMI of Children (N=305).

and parental occupation were found to be significant risk factors of incorrect perception. Parents of Sindhi (odds ratio [OR]: 1.54) and Urdu-speaking origin (OR: 1.49) had higher odds of incorrect recognition of their child's weight compared to parents of other ethnic origins. Although mother's education was not statistically significant (p>0.05), it was observed that with increasing level of education, the chances of incorrect perception in mothers were markedly high (Table-2).

In the multivariate logistic regression, parents of younger children (<8 years) had2.2 times higher odds of incorrect recognition than parents of children with age >=8 years adjusting for parental BMI and child's BMI. Underweight parents had 4.7 times higher odds of incorrect recognition than parents with normal BMI adjusting for child's age and BMI. Overweight/obese parents were 17% more likely to have correct recognition than normal weight parents adjusting for child's age and BMI. Parents of overweight children had 7.2 times higher odds of incorrect recognition than parents of normal weight children adjusting for child's age and parental BMI. Parents of obese children had3.9 times higher odds of incorrect recognition than parents of normal weight children adjusting for child's age and parental BMI.

Discussion

This study aimed at determining the accuracy of parental perception of their child's weight in relation to the child's actual weight as well as a variety of demographic and anthropometric variables.

Limited research has been conducted in the country with specific interest in assessing parental understanding of their child's overweight status. Furthermore, a relationship between perception and actual gauged measurement of the child's weight were also determined, which is also something unique. Thirdly, a new demographic characteristic of parental occupation was identified along with the other known contributing factors that, though not statistically significant, imparted valuable information for incorrect parental perception. It is also noteworthy that the selected sample included only healthy children to get a true reflection of the parent's awareness and, hence, limit the bias.

In the developing countries, the burden of childhood obesity is escalating.[5,25,26] Using WHO growth standards 2007 as a reference, approximately 7.5% of the children in this study were found to be overweight and 8.5% were obese.[23] These results are in agreement with other studies that found comparable prevalence of obesity in various geographical zones of Karachi.[5,26] However, the prevalence of overweight is on the rising trend with the affluent population having proportion as high as approximately 20%.[26] It can be postulated that the weight of a child may differ within the population, with children belonging to higher socio-economic strata having a greater prevalence of being overweight. This poses a great challenge to the countries already struggling with the double burden of malnutrition and communicable diseases.

A high proportion of parents in this study incorrectly perceived their child's actual weight status. About 54% of the parents of normal weighing children underestimated their child's weight, whereas 78% of the parents of overweight children and 81% of the parents of obese children wrongly classified their child's weight status.

Similar results have been projected in researches done internationally.[12,21,27] Hudson et al. identified that approximately 45% parents of obese children and 81% parents of overweight children incorrectly stated their child as being fine.[27] Similarly, in a study done by Eckstein et al, 49% parents of obese children reported their child to be of normal weight, and that of overweight children, about 70% reported their child to be of normal weight.[21] In a Canadian study, parents did not recognise that their

children were overweight; 22% wrongly classified their normal weighing children as underweight;63% considered their overweight children as normal; and 63% perceived their obese children as overweight.[12]

These observations are in congruence with the study rationale as it potentially places these children at an increased risk of obesity-related complications in adulthood. Hence, efforts are needed to improve parental recognition of the problem so as to implement positive behavioural modification in children successfully.

To resolve the issues that arise with parental misperception, it is imperative to understand the reasons why parents fail to recognise their child weight accurately. Global data suggests that a number of biological and demographic contributors have been intricately related to parental misperception, but information regarding these factors in the local context is limited.[16,18,20,27]

Younger age of the child was found to be significantly associated with incorrect estimation of weight by the parents in this study, which is comparable to the global evidence.[16,18,20,21,27] This may be because weight gain and plumpness is generally considered a sign of prosperity and good health in children.

It has been reported in earlier studies that increased BMI in parents is a predictor for obesity in their offspring.[15-18,27] This is in contradiction to the observations in this study, where underweight parents have a higher chance of incorrect perception of their child's weight. Considering that the overall nutritional status in the local population is poor, and particularly with more children being afflicted with malnutrition, there may have been a general shift of parents' perceptions of what constitutes a 'normal weight' in a child, thus resulting in incorrect perception.

In this study, though not statistically significant, observations were made regarding parents incorrectly recognising their son's weight more frequently than their daughters (OR: 1.12 (0.71-1.77). International literature has supported this observation repeatedly.[16,20,27] This may be a point of increased concern, because a mismatch between reality and parental misperception can have negative biological (diabetes, hypertension, dyslipidaemia, early or delayed sexual maturation, metabolic syndrome etc.) and psychosocial implications (eating disorders, social discrimination/stigmatisation, depression etc.) in their daughters and sons.[6,7,27]

A finding unique to this study was the parental occupation as a predictor for incorrect perception. It was found that the parents as doctors had better ability to more accurately identify their child's weight (Table-2). It was surprising to note that the parents who were teachers by occupation had the highest level of incorrect perception (OR 5.99; CI 1.35-26.49; p=0.018). In spite of the fact that the results were near significant, they cannot be generalised as the teachers constituted only 6.2% of the total sample. Yet, one can infer from these trends that, as teachers deal with children on a daily basis, they should have a clear insight in recognising health behaviour patterns of the children.

Sindhi and Urdu-speaking orientation had greater chances of incorrectly perceiving their child's actual weight than other ethnicities in the current study. Since the results are not significant and the local data is scarce, further studies are required with a larger sample size to make a clear inference.

Socioeconomic status was not shown to be a significant predictor of incorrect perception in this analysis. Definitive inference about parental education level as a contributor of incorrect weight perception cannot be made in this study. However, it is noteworthy that these determinants across various studies yielded inconsistent findings.[10,18,20]

A few potential limitations of this study need to be acknowledged. As this is a cross-sectional study, no causal inference can be made. The study being conducted in a single setting with convenience sampling limited its generalisability and due to small sample size, detailed subgroup analysis was restricted. There is a possibility of deliberate under-reporting by the parents of their own weight leading to reporting bias which is a common weakness that is encountered when using self-reported bodyweight. Lastly, by including only normal weighing and overweight children, this study failed to address parental perception of underweight children, which may be a necessary requirement for countries struggling with double burden of malnutrition and obesity.

Further researches, preferably longitudinal studies with a larger sample size, are recommended to find an association between the identified contributors and incorrect parental perception. With the heightened concerns of the growing problem of childhood obesity, recognition of these factors will facilitate the development of strategies for behaviour and lifestyle change. Secondly, it is difficult to intervene in modifying child's behaviour without the support of a parent or caregiver. As such, behavioural interventions often require whole families to modify their routines, which may be problematic if the parent does not perceive their child to be overweight. A key step in forming effective liaisons between health professionals and parents is ensuring shared correct perception — that is to understand what

childhood obesity is and what are its full social, emotional, and health ramifications on children.

Conclusion

Marked discordance between the child's actual weight and parent's perceived weight for their children was observed. It reflects that childhood obesity as a problem in children may not be considered a matter of serious concern by the parents. Several key characteristics that may contribute to incorrect perception of parents were looked at, of which age and BMI of the child, parental obesity and parental occupation were found to be significant factors for misperception.

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