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Inappropriate maternal perception of child's weight status: a potential threat to nutrition

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ABSTRACT

Background: This study was done to know the maternal perception of weight of their children and correlate it with exact weights. We also studied various factors affecting ability of a mother to perceive her child's weight status.

Method: This prospective study was done in Pediatric Department of a tertiary care teaching hospital of Western Gujarat, India, from January 2018 to September 2018. 897 mothers of children < 5 years of age were included. Sociodemographic and anthropometric details of child and mother were recorded. Maternal perception of their child's weight status was enquired. A correlation between perceived and actual child weight status was estimated.

Results: 897 patients <5 years of age had mean (SD) age of 28.66 (±17.04) months, weight 10.17 (±3.5) kg, height 0.81 (±0.15) meters and BMI 15.74 (±15.26) kg/m2. 34.7% of mothers perceived underweight erroneously as compared to actual weight status being normal (p value=0.00001). Misperception (under or over) of the mothers for their children weight status was significant for girls (p=0.011). Significant difference between perceived and actual weight status was seen in birth orders 1 to 4. 34. 6% actual UW children were perceived as NW by < 40 years age mothers (p=0.0018). 78.2% uneducated and 81% of primary or secondary educated mothers from lower SES felt their children were of NW status whereas actually 43.4% and 50.3% children were of NW status respectively (p=0.00001). Surprisingly, 91.3% of graduate or postgraduate mothers of middle SES perceived their children as NW status while actually only 39.1% were of NW and 52.1% of UW (p=0.00001).

Conclusion: Half of the mothers were not able to perceive correct weight status of their children. Misperception was significant for girls. Significant difference between perceived and actual weight status was seen for birth orders 1 to 4. Mothers <40 years of age significantly failed to perceive actual UW status of the children. Both educated and uneducated mothers misclassified their children's weight status significantly.

Keywords: Maternal Perception, Normal weight, Nutrition, Obesity, Overweight, Underweight

INTRODUCTION

Maternal knowledge of child's normal weight is crucial for child health. If mother is not able to perceive weight of her child correctly then how will she provide proper nutrition to child? Several studies have been conducted on maternal perception of children's weight in western countries where childhood obesity was main concern, but limited data are available in India where burden of malnutrition is very high.1 According to NFHS-3 (National Family Health Survey-3) and NFHS-4 data, 46% children in India and 26.4% children in Gujarat, under 5 years of age are moderate to severe malnourished respectively.^{2,3} Interventions to treat and prevent malnutrition are unlikely to be successful if mothers do not recognize their children as malnourished.

In this study, most of participants belonged to low socioeconomic status from rural areas of Kutch district where educational attainments of mothers were significantly low. Aim of this study was to quantify maternal misclassification of children's weight status and to educate the mothers regarding proper nutrition which could be possible by homemade foods. We explained short and long term consequences of under nutrition and tried to change their behavior and wrong perception.

The primary objective of this study was to know the correlation between the child's weight status as perceived by the mother and actual weight status. Secondary objective was to study the effect of mother's age, educational attainment of the mother, birth order of the child and socioeconomic status of family on the mother's perception of their children's weight status.

METHODS

A Prospective study conducted in the field practice area of a Pediatric Department of a tertiary care teaching hospital of Western Gujarat, India. Study was conducted for the period of January 2018 to September 2018.

Inclusion criteria

All under 5 years old children who came to Pediatrics OPD

Exclusion criteria

Children suffering from chronic disorders (e.g. congenital heart disease, chronic kidney and liver diseases).

The study was approved by Institutional Ethics Committee of our institute. Written informed consents of the parents were taken. Detailed history and systemic examination were done to rule out any chronic disease. Child's age, sex, weight (measured by electronic weighting scale) and length/height (measured by infantometer/stadiometers) were assessed using standard protocols. Body Mass Index (BMI) {kg/m2} was calculated. WHO reference curves for BMI (underweight: <5th percentile, normal weight: between 5th-85th percentile, overweight: between-85th-95th percentiles and obesity: >95th percentiles for age and sex) were used to assess children's actual weight status.

Age and educational attainment of mothers were asked. Birth orders of the child and socioeconomic status of family according to "Modified Kuppuswamy Scale" were noted.⁶ Mothers were asked the weight of their children as they perceived. Maternal perception of their children's weight status was asked {"how would you describe your children's weight status"- underweight (UW) or normal

weight (NW) or overweight (OW). Then, maternal perception of the children's weight status and actual weight status were correlated.

The mothers were educated to correctly perceive the weight status of their children. They were also explained that how misperception of child's weight could affect growth of their children and its long term consequences. Knowledge regarding homemade foods, which contain dense calories and protein value with all micronutrients, was given to mothers.

Data was analyzed using Microsoft Excel sheets. 2-tailed Pearson correlation coefficient for perceived and actual weight correlation, chi-square test for categorical variable, independent sample t-test for variable with two categories and one way ANOVA test for variable with three or four categories were used for data analysis. P value <0.05 was considered significant.

RESULTS

Table 1 shows the demographic and anthropometric details of children. 897 patients <5 years of age had mean (SD) age of 28.66 (± 17.04) months, weight 10.17 (± 3.5) kg, height 0.81 (± 0.15) meters and BMI 15.74 (± 15.26) kg/m2.

Table 1 also depicts the maternal perception of their children's weight status. The mothers perceived 162 (18.06%) children as UW, 717 (79.9%) as NW and 18 (2.0%) as OW. 47.82% mothers correctly perceived weight status of children. 34.7% mothers perceived their NW children erroneously as UW. 6% actual OW and obese children were perceived as UW or NW by mothers (p=0.00001). Out of 534 (59.5%) boys, mothers had perceived as UW in 87 (16.29%) and NW in 447 (83.7%). 180 (33.7%) actual UW and 30 (5.5%) actual OW/ obese boys were perceived as NW. Similarly, 42 (7.8%) actual NW children were perceived by mothers as UW. In 363 (40.4%) girls, mothers had perceived as UW in 75 (20.66%), NW in 270 (74.3%) and OW in 18 (4.9%). 132 (36.3%) actual UW and 12 (3.2%) actual OW/ obese girls were perceived as NW. Mother's misperception of her child's weight status was significant for girls (p=0.011) while not significant for boys (p=0.161).

There was positive and significant correlation between perceived weight (kg) by mother and actual weight (kg) of child in all three categories {UW (p=0.0001, r=0.884), NW (p=0.0001, r=0.870) and OW (p=0.0001, r=0.947)}; implying that mothers were able to perceive weight of the children correctly.

However, they were not able to correctly perceive the weight status of their children. There was significant difference between the weight status of the children perceived by mother as UW (18.06%), NW (79.9%) and OW (2.0%) and the actual weight status according to

BMI as UW (42.47%,), NW (50.8%), OW (2.3%) and

obese (4.3%) (p=0.00001) (Table 1).

Table 1: Demographic details and anthropometric parameters of children; it's correlation with maternal perception of child weight status.

ъ		Actual child weight status#					
Demographic details of the children	Maternal perception of child weight status	Underweight ^{\$} 381 (42.4%)	Normal weight ^{\$} 456 (50.8%)	Overweight ^{\$} 21 (2.3%)	Obesity ^{\$} 39 (4.3%)	p value	
Number of children \$ (n=897)	Underweight 162 (18.06%)	60 (6.6%)	90 (10%)	3 (0.3%)	9 (1%)		
	Normal weight 717 (79.9%)	312 (34.7%)	363(40.4%)	18 (2%)	24 (2.6%)	0.00001	
	Overweight 18 (2.0%)	9 (1%)	3 (0.33%)	0	6 (0.66%)	i6%)	
Age* 28.66 (17.04) months	Underweight 30.3 (17.07)	36.3 (18.5)	25.0 (17.24)	7.0	52.0 (6)		
	Normal weight 28.16 (17.05)	30.6 (17.34)	26.08 (15.4)	32.0 (20)	25.0 (15.8)	0.0001	
	Overweight 33 (17.05)	30.6 (18.5)	60.0	0	23.0 (1.09)		
Candans	Underweight 87 (16.2%)	39 (7.3%)	42 (7.8%)	3 (0.5%)	3 (0.5%)		
Gender ^{\$} Boys (n=534, 59.5%)	Normal weight 447 (83.7%)	180 (33.7%)	237(44.3%)	12 (2.2%)	18 (3.3%)	0.161	
	Overweight 0	0	0	0	0	_	
	Underweight 75 (20.6%)	21 (5.7%)	48 (13.2%)	0	6 (1.6%)		
Girls (n=363, 40.4%)	Normal weight 270 (74.3%)	132 (36.3%)	126(34.7%)	6 (1.6%)	6 (1.6%)	0.011	
	Overweight 18 (4.9%)	9 (2.4%)	3 (0.82%)	0	6 (1.6%)		
Wainhak	Underweight 9.1 (3.5)	10.06 (3.6)	10.06 (3.8)	7.8	13.2 (1.9)	0.0001 (r=0.884)	
Weight* 10.17 (3.5) kilogram	Normal weight 9.5 (3.3)	9.7 (3.3)	10.0 (2.9)	11.6 (4.9)	12.8 (4.3)	0.0001 (r=0.870)	
Kilografii	Overweight 10.8 (6.4)	7.8 (2.5)	27	0	11.8 (2.4)	0.0001 (r=0.947)	
TT 1 1 ak	Underweight 0.81 (0.15)	0.9 (0.18)	0.78 (0.13)	0.63	0.64 (0.15)		
Height* 0.81 (0.15) meter	Normal weight 0.81 (0.15)	0.84 (0.16)	0.79 (0.13)	0.77(0.17)	0.77 (0.13)		
	Overweight 0.85 (0.15)	0.79 (0.12)	1.2	0	0.73 (0.09)		
BMI* 15.74 (15.26) Kilogram/meter ²	Underweight 15.89 (15.28)	12.8 (1.7)	15.8 (1.9)	19.6	35.3 (13.6)		
	Normal weight 15.69 (15.27)	13.13 (1.3)	17.34 (3.3)	18.5 (0.64)	20.9 (2.9)		
	Overweight 16.19 (15.30)	12.2 (2.7)	16.7	0	21.7 (1.04)	-	

^{*}Mean (SD), #According to BMI, \$ Number(%), r correlation coefficient.

Table 2 shows that 879 (97.9%) mothers <40 years of age had perceived their children's weight status as UW in 156 (17.7%), NW in 705 (80.2%) and OW in 18 (2.04%). 34.6% actual UW children were perceived as NW by <40 years age mothers (p=0.0018). 38.8% mothers of >40 years of age failed to perceive actual UW of the child.

Birth order of children were 1 or 2 in 66.8%, 3 or 4 in 30.1% and 5 or 6 in 3%. 10.5% actual NW and 36.5% actual UW children of birth order 1 or 2 were wrongly perceived by mothers as UW and NW respectively. In birth order 3 or 4, mothers perceived NW in 81.1% children while actually only 46.6% were of NW.

Significant difference between perceived and actual weight status was seen for birth order 1/2 (p=0.045) and 3/4 (p=0.016), while not for birth order 5/6 (p=0.332). This could be due to the fact that mothers with > 4 birth order are experienced enough to perceive correctly their children's weight status.

As seen in Table 3, 78.2% uneducated mothers from lower SES felt that their children were of NW status, whereas, actually only 43.4% children were NW (p=0.00001).

Amazingly, only 16.8% of primary or secondary educated mothers from lower SES correctly estimated UW status as against actual UW present in 43.6% children; conversely, 81% of primary or secondary educated mothers from lower SES perceived that their children were NW when only 50.3% had NW status actually (p=0.00001).

Similarly, 76.5% of primary or secondary educated mothers of middle SES perceived their children's weight status as NW while actually NW status was only in 36.1% children (p=0.001). Surprisingly, 91.3% of graduate or postgraduate mothers of middle SES

perceived their child as NW status while actually only 39.1% were of NW and 52.1% of UW (p=0.00001). 7.8% mothers of middle SES felt that their children were UW or NW while actually they were obese. Direct effect of education on mother's perception of their children's weight status was not seen. Both educated and uneducated mothers misclassified their children's weight status significantly.

DISCUSSION

This study shows high rate of maternal misperception of child weight status; 34.7% actual UW children were perceived as NW, while 10% actual NW children were perceived as UW (p=0.00001). Correlation between perceived weight (kg) by mother and actual weight (kg) of children in UW (p value-0.0001, r-0.884), NW (p value-0.0001, r-0.870) and OW (p value-0.0001, r-0.947) were showing statistically significant correlation coefficient Jani R, et al, found quarter of mothers overestimated their UW children as NW. 65.2% UW and 61.6% OW/obese children were misclassified by mothers as being a NW. A meta-analysis showed that nearly half the parents of underweight children perceived their children to be of NW. 9,10

Table 2: Demographic details of the mothers and it's correlation with maternal perception of child weight status.

Demographic details of the mother*		Maternal	Actual child weight status#					
		perception of child weight status*	Underweight* 381 (42.4%)	Normal weight* 456 (50.8%)	Overweight* 21 (2.3%)	Obesity* 39 (4.3%)	p value	
Mothers'	<40 years n=879 (97.9%)	Underweight 156 (17.7%)	57 (6.4%)	87 (9.8%)	3 (0.3%)	9 (1%)		
		Normal weight 705 (80.2%)	305 (34.6%)	361 (41%)	15 (1.7%)	24 (2.7%)	0.0018	
		Overweight 18 (2.04%)	9 (1%)	3 (0.3%)	0	(0.6%)		
	>40 Years n=18 (2%)	Underweight 6 (33.3%)	3 (16.6%)	3 (16.6%)	0	0	0.136	
		Normal weight 12 (66.6%)	7 (38.8%)	2 (11.1%)	3(16.6%)	0		
		Overweight (0)	0	0	0	0		
Birth order	1 or 2 n=600 (66.8%)	Underweight (117, 19.5%)	42 (7%)	63 (10.5%)	3 (0.5%)	9 (1.5%)		
		Normal weight (474, 79%)	219 (36.5%)	228 (38%)	15(2.5%)	12 (2%)	0.045	
		Overweight (9, 1.5%)	6 (1%)	0	0	3 (0.5%)		
	3 or 4 n=270 (30.1%)	Underweight (42, 15.5%)	15 (5.5%)	27 (1%)	0	0	0.016	
		Normal weight (219, 81.1%)	78 (28.8%%	126 (46.6%)	3 (1.1%)	12 (4.4%)		
		Overweight (9)	3 (1.1%)	3 (1.1%)	0	3 (1.1%)		
	5 or 6 n=27 (3%)	Underweight (3)	3 (11.1%)	0	0	0		
		Normal weight (24)	15 (55.5%)	9 (33.3%)	0	0	0.332	
		Overweight (0)	0	0	0	0		

^{*}According to BMI, *Number (%)

Table 3: Socioeconomic status and education of the mothers and it's correlation with maternal perception of child weight status.

Socio- economic Status*	Mothers' Education Level*	Maternal perception of child weight status*	Actual child weight status#					
			Under weight* 381 (42.4%)	Normal weight* 456 (50.8%)	Overweight* 21 (2.3%)	Obesity* 39 (4.3%)	p value	
Lower & Upper Lower n=769 (85.7%)	Uneducated 336 (43.6%)	Underweight 68 (20.2%)	30 (8.9%)	38 (11.3%)	0	0	0.00001	
		Normal weight 263 (78.2%)	98 (29.1%)	146 (43.4%)	5 (1.4%)	14 (4.1%)		
		Overweight 5 (1.4%)	2 (0.5%)	0	0	3 (0.8%)		
	Primary or secondary education 433 (56.3%)	Underweight 73 (16.8%)	21 (4.8%)	44 (10.1%)	3 (0.6%)	5 (1.1%)	0.00001	
		Normal weight 351 (81%)	164 (37.8%)	172 (39.7%)	11 (2.5%)	4 (0.9%)		
		Overweight 9 (2.0%)	4 (0.9%)	2 (0.46%)	0	3 (0.69%)		
Upper Middle and Lower Middle n=128 (14.2%)	Uneducated 12 (9.3%)	Underweight 7 (58.3%)	3 (25%)	1 (8.3%)	0	3 (25%)	0.159	
		Normal weight 4 (33.3%)	1 (8.3%)	1 (8.3%)	1 (8.3%)	1 (8.3%)		
		Overweight 1 (8.3%)	1 (8.3%)	0	0	0		
	Primary or secondary education 47 (36.7%)	Underweight 8 (17.0%)	6 (12.7%)	1 (2.1%)	0	1 (2.1%)	0.001	
		Normal weight 36 (76.5%)	13 (27.6%)	17 (36.8%)	1 (2.1%)	5 (10.6%)		
		Overweight 3 (6.3%)	2 (4.2%)	1 (2.1%)	0	0		
	Graduate or Postgraduate 69 (53.9%)	Underweight 6 (8.6 %)	0	6 (8.6%)	0	0	0.00001	
		Normal weight 63 (91.3%)	36 (52.1%)	27 (39.1%)	0	0		
		Overweight (0)	0	0	0	0		

Various studies on this subject have been conducted in western countries where burden of obesity is high, so authors found that most parents do not recognize their children as obese. A Metasynthesis of current research also found that parents were more likely to misperceive their child's weight. Children's actual weight was different from their parents' perception of their weight status. A systemic review done shows that in 19 of 23 studies, more than 50% parents of OW children were not able to recognize their children as OW.

This study shows that maternal misperception of their children's weight status is significant for girls (p=0.011) while not significant for boys (p=0.161). This finding is similar to studies in which they found that mothers

tended to underestimate their sons weight status more than their daughters weight status. ¹⁹⁻²¹ In this study, both educated and uneducated mothers misclassified their children's weight status significantly (p=0.00001). Surprisingly, 91.3% of graduate or postgraduate mothers of middle SES perceived their child as NW status while actually only 39.1% were of NW and 52.1% of UW (p=0.00001); this could be due to the fact that most of them were working women, spending less time with their children.

Previous studies have shown that parents with a lower level of education were more likely to misperceive their children's weight status.²² 79% of mothers failed to perceive their overweight child as overweight; mothers with high school education greater misclassified their

children overweight status then mothers with college education.²³ Less educated mothers were more likely to misperceive the nutritional status of their children.^{20,24}

In this study, we found that 51.7% mothers <40 years of age significantly misclassified their children's weight status (p=0.0018). Younger mothers were more likely to overestimate the nutritional status of their children compared with mothers older than 35 years of age.²¹ Similarly, Mothers between 24-35 years of age had lower misperception of children's weight status than mothers < 24 years of age.²⁵ Conversely, Aparicio G, et al. observed that mothers >40 years of age were more likely to misperceive children's weight status.²⁶ In our study, 51.2% mothers from lower and 57.8% from middle SES failed to perceive their children's weight status correctly (p=0.0001). Parents with medium or high SES were more likely to be correct than from low SES.²⁷

CONCLUSION

In this study, half of the mothers were not able to perceive correct weight status of their children. Misperception was significant for girls as compared to boys. Significant difference between perceived and actual weight status was seen for birth orders 1 to 4 while not for 5 and beyond. Mothers <40 years of age significantly failed to perceive actual UW status of the children as compared to >40 years of age. Both educated and uneducated mothers misclassified their children's weight status significantly.

As compared to the western countries, burden of underweight children is high in India. There is a need to educate the mothers regarding proper nutrition of their children. They should be explained that how misperception of child's weight could affect growth of their children and its long term consequences. Knowledge regarding homemade foods, which contain dense calories and protein value with all micronutrients, should be given to mothers.

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