

PARENTAL MISPERCEPTION OF CHILD'S WEIGHT STATUS AND ITS IMPLICATIONS FOR MALNUTRITION PREVENTION, LAHORE, PAKISTAN

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Abstract

It is vital for malnutrition prevention, that parents possess awareness about their child's health status. A cross-sectional study to examine the parent's awareness about child's health was conducted in Lahore Pakistan. Sample students (age 7-13 years) were collected from local private and government schools, as parents were provided with a questionnaire, consisting of inquiries related to demographic, general nutrition, child body image scale and the new vital sign. The height and weight of the children were collected, and child BMI was measured using CDC standards. Chi-square was applied to check the association between predictor variables and the dependent variables. (Parent's accuracy of perception of child's weight). A sample of 202 parents and children (3-17 years) was selected. 80% of the normal weight children were overestimated by their parents. About 8% of obese children, 25% of underweight children were overestimated by their parents, and 3% of underweight and 5% of healthy children were accurately estimated by their parents. Most of the parents overestimated their child's weight status. Only 5% of the parents accurately perceived their child's weight, parent's overestimation is a common trend in this sample, regardless of parent's variables, income, education, and health literacy. The high trend of child's weight status represents an alarmingly low rate of health literacy of parents regarding child health, awareness among the parents to improve their health literacy and perception should be made.

INTRODUCTION

Malnutrition in children is one of the major causes of concern worldwide as well as one of the threats to global health promotion and infant and child morbidity that can be modified. Many studies conducted over the past years suggest that malnutrition exerts a multiplicative pressure on health promotion by increasing the risk of mortality from infectious or communicable diseases (Almoosawi, 2016). Like many other major health concerns, malnutrition is vividly prevalent in the

South Asian Region where almost 50% of the world's malnourished children are found within just 3 countries i.e. Bangladesh, India and Pakistan. South Asia is the most affected region of the world as well as the continent and projects an "Asian Enigma" due to an increased rate of low birth weight (LBW) in infants, unsatisfactory hygienic conditions, unhealthy breastfeeding and complementary feeding practices and the poor nutritional, educational and financial status of women (Binkin, 2013).

Under-nutrition is a major health concern in Pakistan and plays a major role in the country's elevated child morbidity, mortality and increased hidden hunger rates in the region. An average of 43% Pakistani children is stunted, 16.8 % is wasted and 31.2 % is underweight. The prevalence of malnutrition has been varying between 45-67 % for the past 40 years. But no significant improvement has been observed (WHO, (2000). Over the past two decades, there has been no significant change in the increased prevalence of child malnutrition in the Pakistani population even though now there is more food available, more facilities and awareness as well as the caloric intake per capita has also increased. This can also be related to the multifaceted and compound nature of malnutrition which also includes issues related to poverty, politics, illiteracy and those that majorly effect the intra-household food insecurity and social and cultural factors that determine the dietary intake patterns in teenage, pregnancy and early childhood years (Campbell, 2006).

Furthermore, a rise in childhood obesity has been seen in Pakistan but there is no documented evidence yet. Childhood obesity is also one of the most alarming challenges substantially effecting the world these days. This child health problem prevails universally and is constantly affecting most of the low and middle-income countries, particularly in urban locales. In urban centres, we observe a significant rise in sedentary lifestyles (low physical activity) and unhealthy dietary (eating) habits at an earlier age (Parkinson, 2017). In 2010, the number of overweight children under the age of five was estimated to have increased over 42 million, globally. Almost 35 million of these overweight children lived in developing or third world countries. The trend of childhood obesity in the U.S. prevails in a manner that every 1 out of 5 children is obese and this has been stagnant for the past 10 years. Obesity has been associated with an increased incidence of cardiovascular diseases, stroke and diabetes mellitus. Childhood obesity leads to an increase in the incidence of Type 2 Diabetes Mellitus for which precursors have increased blood insulin levels (hyperinsulinemia) and insulin resistance (IR). Insulin resistance is also indicated as the start of the metabolic syndrome that is associated with visceral

obesity, hypertriglyceridemia, imbalanced lipid profile (low HDL and high LDL), and hyperglycaemia. Childhood obesity is very likely to prevail until and through adulthood as well as to making persons develop an increased risk to develop diseases like dyslipidaemias, hypertension, and CVDs (cardiovascular diseases) during earlier years of age and the increased risk of arthritis, sleep apnea (in adulthood and old age) and even premature death upon reaching to adult age. This study also focuses on providing a rough picture of childhood obesity in the urban units of Pakistan (Duncan, 2015).

Another important factor is parents' vivid lack of awareness about their child's overweight, underweight and malnutrition status. Their health literacy is low which affects their perception and beliefs regarding child nutrition and health status (Remmers, 2014). It has been a major concern at a national level, especially, in Pakistani rural areas, where the literacy rate is low. Globally, parents are seen to be underestimating their child's overweight or obesity status (Wijnhoven, 2014). Urban parents in the U.S. are usually seen to be underestimating their child weight and growth status. Studies showed that more than 60% of the U.S. parents underestimated their child's weight (Gentile, 2018). Parent's engagement regarding child nutrition, growth and weight management is a primary factor determining barriers to child health promotion. If parents cannot judge the weight status of their child, it is more likely that they may not be able to participate in providing the healthy lifestyle behaviour for their children (Rietmeijer-Mentink, 2013). The exact causal factors behind the fact that parents underestimate their child's weight status are still not well established. The factors that influence parents' concepts regarding child's nutritional status and growth are not well documented (Kelleher, 2018).

Previously, some studies showed that there is no significant association present between the socio-economic factors race, ethnicity, income, education status of the parents, child's age & gender and their underestimation and overestimation of child's weight. Yet, few recent studies have shown that these misconceptions are associated with ethnicity, income, age, gender, health literacy status and social status of the parents (Queally, 2018). It has been

seen that there is an association between the child's age, gender and the weight underestimation of the parents. Parents were more likely to underestimate the weights of children at younger ages and incorrectly estimated the body weights of the boys (McKee, 2016).

It is evident from the scientific literature that parent's health literacy is also another predictor variable of parent's inaccurate estimation of child's body weight. In Pakistan, it has been seen that employment status and education level of the mother has a direct influence on children's nutrition status including major indications such as stunting, wasting, and underweight status. For instance, as the education status of parents proceeds through illiterate to above matriculation, wasting rates fall from 8.1% to 4% (Nemecek, 2017).

The major purpose of this study was to observe how health literacy as well as other determinants of health influence the child's nutrition status. We have hypothesized that parent's education status and health literacy status directly affect their concepts of child's body image and ideal body weight which implies the risk for malnutrition i.e. wasting and obesity in their children. A model of parents' underestimation of child weight status was presented with both parent and child factors as predictor variables.

METHODS

Sample

A convenient sample of students and parents was selected from the government and private schools. Inclusion criteria were 7-13 years old children and their parents who could participate physically. Parents and children who could not physically participate were excluded from studies and their data was also not included. The sample consisted of 202 parents and 202 children.

Procedure

Data was collected through a questionnaire that was handed over to the students to be solved by their parents, and the next day anthropometric measurements of those students were taken in the school during the working hours of the teams. The team opted both verbal and nonverbal communication methods for data collection from

parents; who were to be assessed for health literacy and demographic characteristics; by availing the opportunity of parents' and teachers' meetings. Parent interview-based data collection took 15 minutes or less per person.

MEASUREMENTS

Demographic characteristics

The demographics that needed to be recorded were parent characteristics, which included age, gender, religion, education, and income. Children characteristics consisted of age, gender, and grade in school.

Anthropometric measurements

Children' height and weight were recorded in the classrooms, without shoes, on a smooth wall with help of measuring tapes both in centimetres and inches. Weight was measured using the portable digital weighing machine, which measured up to nearest 0.1 kg. This whole data was collected to measure BMI (body mass index) and was described in the data as percentiles as per CDC guidelines for descriptive purposes. For BMI, percentile below 5th percentile is underweight, the 5th-85th percentile is healthy, the 85th-95th percentile is overweight and above the 95th percentile is obese.

Perceived child body size

A tool called CBIS Children's Body Image Scale was deployed to measure the perceived child body size, a pictorial scale with 7 gender-specific prepubescent body pictures representing standard 3rd-97th BMI percentiles. Parents were asked to identify the picture that they thought resembled their child and a picture with an ideal image that they want to achieve for their child. Test-re-test reliability of the CBIS has previously been reported in the range of 0.76–0.86.

Parent's estimation of weight status

Each child's actual/ current weight status was converted to a corresponding figure on CBIS by using BMI percentiles. For more accuracy, each child's actual weight was subtracted from perceived weight to determine estimations (Over and Underestimations were both considered). A positive score indicates an underestimation of child weight status and the negative score predicts vice-versa.

Newest Vital Sign

Newest Vital Sign (NVS) was the tool utilized to assess health literacy of parents who participated in the study. Our NVS was based off on an ice cream consisting of six accompanying questions based on ice cream food label. Scoring of NVS was done as ordinal variables. Descriptive statistics present scores as an ordinal variable, interpreting scores 0–1 as high likelihood of limited health literacy, scores 2–3 as the possibility of limited health literacy, and scores 4–6 as adequate health literacy analyses (Howe, C.J., et al.). NVS was entered as a continuous variable for univariate correlations and the random effects. The NVS has adequate reliability (α 0.76–0.79) and good criterion validity has been established with the full version of TOHFLA. For an average person, NVS takes about 3 minutes or less to solve.

Ethical Considerations

Ethical letter has been taken from Research Ethical Committee of University of South Asia under the IRB. No. USA-RW/DR/2023/04/064.

RESULTS

The study included 202 parents and 202 children, and each parent's one child was included in the study. The mean age of parents was 47.9 years and all of the parents belonged to the religion Islam. About 24.3% had only done intermediate, 35.6% parents had completed graduation, and 19.8% were postgraduate. About 12.9% parents' monthly income was reported to be more than PKR 50,000 (see **were boys** and 84.2% were girls.). The mean age of children was 10.3 years, of which 15.8% were boys and 84.2% were girls. CDC classification of weight status was used to classify the children, and more than half of them were a healthy weight, about 13.8% were overweight or obese, and 22.3% were underweight.

Table 1:

Parent and Child Characteristics	
Characteristic	Number (%)
Parents (N = 202)	
Mean age	47.9 years (SD 20.71)
Gender	
Males	100 (49.5)
Females	101 (50)
Refused	1 (0.5)
Religion	
Islam	202 (100)
Education	
Middle	2 (1.0)
Matric	24 (11.9)
Intermediate	49 (24.3)
Undergraduate	72 (35.6)
Postgraduate	40 (19.8)
Refused	15 (7.4)
Family monthly income	
< 15k	6 (3.0)
15k-24,999	14 (6.9)
25k-49,999	50 (24.8)
50k-74,999	24 (11.9)
75k-99,999	2 (1.0)
>100,000	4 (2.0)
Refused	102 (50.5)
Health Literacy	
Limited HL	158 (78.2)
Adequate HL	44 (21.8)
Child (N = 202)	
Mean age	10.3 years (SD 1.53)
Gender	
Boys	32 (15.8)
Girls	170 (84.2)
Weight status	
Underweight	45 (22.3)
Healthy weight	122 (60.4)
Overweight	17 (8.4)
Obese	11 (5.4)
Refused	6 (3.0)
Missing	1 (0.5)

Parent Perception of Weight Status

About 22.3% and 8.4% children were underweight and overweight respectively, but only 3% of the parents chose a body figure corresponding to their

child's actual weight status. More than half of the parents overestimated their child's weight status irrespective of their child's actual weight status of underweight, healthy, or obese (Fig.).

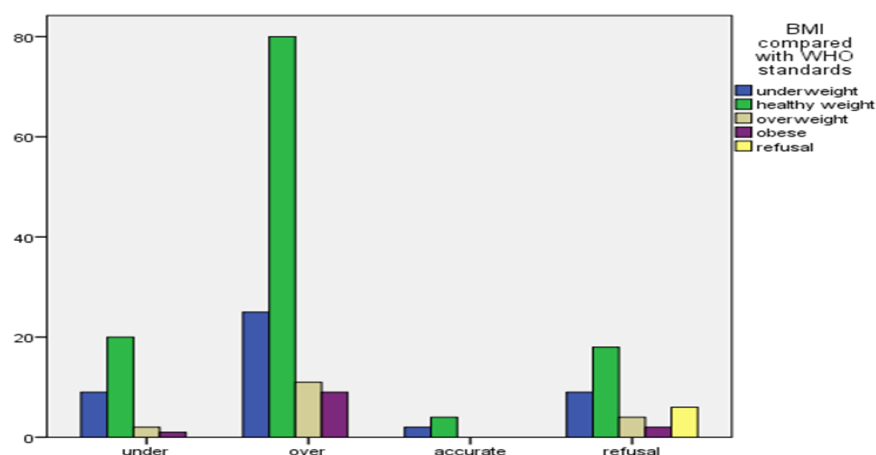


Fig. 1 Parent estimation of child weight status by actual weight status.

Chi-square for Parents' Estimation of Child Body Size

Table 1). The parent factors consider the effect of parent characteristics (i.e. parent health literacy, income, religion, qualification) on the parents' estimation of child weight status whereas the child factors demonstrate the effect of child characteristics (i.e. child age and BMI) on the parents' estimation of child weight. There was significant association between child BMI and parents' estimation of child weight status ($p = 0.003$). The parents were more likely to overestimate or underestimate the child weight status of children who had a BMI less than

Chi-square was applied to examine the effects of parent factors and child factors on the parents' estimation of child weight status (85th percentile). However, as the child BMI increased more than 85th percentile, the parents were less likely to overestimate or underestimate the child weight status. There was a significant correlation between the child gender and the parents' estimation of child weight status ($p = 0.001$). This means that the parents were more likely to underestimate or overestimate the weight status of girls. None of the other factors (parent qualification, religion, income, health literacy) had a positive correlation with the parents' estimation of child weight status.

Table 1

Summary of chi-square demonstrating the effects of parent and child predictors on parents' estimation of child weight status.

Effects	Chi-square	P-value
Parents health literacy	2.241	0.524
Parent qualification	12.328	0.654
Parent income	18.158	0.445
Parent religion (Islam)		
Child BMI	29.863	0.003
Child gender	17.659	0.001

DISCUSSION

In this research, our focus was to find those factors which may affect the parents' perception of their child's weight. Our findings suggest that increasing number of parents misperceive the weight of their children and this trend is evident from a previous study in which parents' underestimate the weight of their overweight children.

This is a unique feature of our study that we focused on overall parents' estimation of their child's weight and our results suggest that higher percentages of parents misperceive the weight of their healthy weight children than previously reported in a literature.

In Pakistan, this study was conducted for the first time so we must compare our results with the similar studies conducted all over the world.

Parent Predictors of Parent Estimation of Child Weight

It has already discussed above, as far as we know, our study is the first one in Pakistan to determine the association of parents' health literacy and other social determinants with parents' perception of child weight status.

In our research, no significant association was seen between parents' predictors (including income, education, and health literacy) and parents' estimation of child's weight. If we look at our study and other similar studies, we cannot come to a clear conclusion as some studies show association of parents' predictors with parental perception of child's weight while others do not.

The results of our study showed no association between parents' education and parents' estimation of child's weight, and these results are like the previous studies. Other studies showed an association between maternal education and accurate estimation of child body weight (Robinson, 2017).

Similarly, no association was observed between income and parents' estimation of child's weight just like a previous study but there were some studies which reported that the people of the less deprived area are less likely to underestimate their child weight and more likely to overestimate as compared

to the people of the more deprived area (Tompkins, 2015).

Another parent predictor is health literacy; according to our finding no significant association between health literacy and parents' estimation of child's weight was observed contrary to another study which showed a positive association. A significant statistical association was observed between parents' health literacy level and parents' accurate estimation of child's weight. According to an odd ratio 0.98, it was observed that the parents with high health literacy were more likely to accurately perceive their child's body weight.

So, an increasing trend of misperceiving child's weight status by their parents was observed regardless of parents' predictors discussed above. In Pakistan, it is mostly observed that parents emotionally evaluate their child's weight. Mostly parents misperceive by underestimating their overweight or obese child and overestimating their underweight child as they feel shy to be stigmatized by the society, so they don't tell the exact weight of their child. Another fear is being judged by others which is also a factor for not estimating the weight of their child accurately (Szamreta, 2017).

Another important factor is changing societal norms and one of them is that overweight and obese children are also considered as normal or healthy, so parents fail to accurately perceive the weight of their children as they don't know how overweight looks like. They think that their child is healthy if he is happy and actively play with his peers and keep up with them no matter how much overweight he is, so we can say heavy weights may be becoming more acceptable for our society and culture.

Child Predictors of Parent Estimation of Child Weight

In our study, there were no parent predictors associated with parent's estimation, only child's gender and BMI were the two child predictors which were significantly associated with parents' estimation of child weight. In our study, most of the parents overestimated the child's weight who had a BMI less than the 85th percentile. Our findings, however, contradict with other studies that report that

majority of the parents underestimate their child weight of younger age. Another child predictor positively associated with parental misperception of child's weight was child gender, in which majority of the parents underestimated and overestimated the weight status of girls. (Zhang, 2018). Around 105% of the girls were overestimated and 25% were underestimated by their parents. This data shows the parents have biased attitude towards girls' health and nutrition in our country as no such association was observed in other studies.

Children included in our study had ages from 7 to 13 years old, which is the age range where parents' take a decision regarding lifestyle and eating. About more than half of the children included in our study had a healthy weight, which doesn't suggest that underweight or overweight is at an alarming rate and do not call for strict or rapid weight control measures.

The parents of our study overestimated the weight of those children who had a BMI less than the 85th percentile, and this BMI range includes the children who had healthy weight or underweight. Thus, we can say that lower BMI is a significant predictor of parents' weight overestimation. Parents may accurately perceive the weight status of overweight and obese children, but they may misperceive the weight when the child is underweight. This data may play a major role for the malnourished children, showing that the parents, who overestimated the weight of an underweight child, may not know the correct weight status of their child and may not be able to take actions of a healthy diet for their underweight child, which ultimately increases the risk of malnutrition. Promoting the awareness of parents regarding their child's weight may help to overcome malnutrition problem.

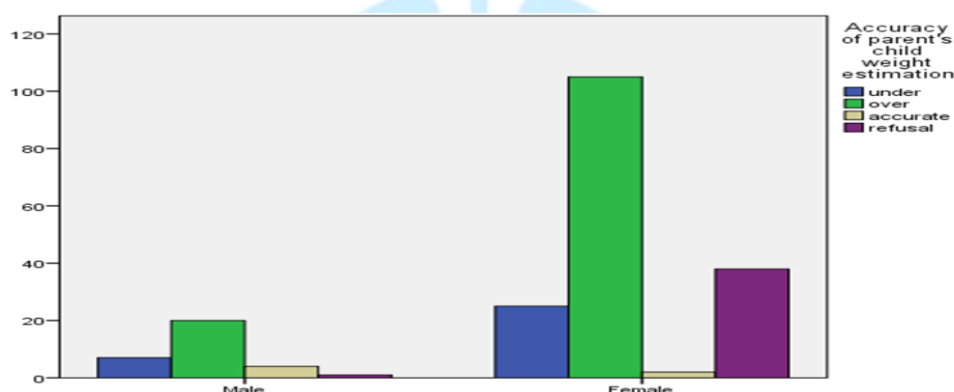


Fig. 2 Comparison of parents' estimation of child weight status by child's gender.

Limitations

There were several limitations to this study. This study did not take into consideration the children suffering from PEM, lactose intolerance, celiac diseases, fibrocystic disease of the pancreas, and non-specific diarrhoea. During the data collection, the parents who were interviewed for the study cannot be the representative of the entire population in this regard we cannot suggest that our data is specified. The selected parent might have been more interested in child health. Other barriers to the absolute accuracy of the data were the mind-set of the parents, and lack of seriousness towards providing the information correctly. The limited health literacy was prevalent in most of the parents which could suggest

faults in education infrastructure. Limited anthropometric measures* of child parameters were measured, and their biochemical profile was not assessed. The actual biochemical picture of the child's condition could not be assessed, which could have been helpful in determining the reasons for malnutrition.

*limited anthropometric measures, include only the weight, height and BMI calculations Whereas, skinfold measurements and mid-upper arm circumference were neglected.

CONCLUSION

This research was conducted to check the level of malnutrition in Pakistan since National Nutrition

Survey (NNS) is a decade-based survey, which only targets the health of children under the age of 5 years, and there is no such research on malnutrition in the school-going children. The high trend of child's weight status represents an alarmingly low rate of health literacy of parents regarding child health, awareness among the parents to improve their health literacy and perception should be made.

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