Original Article

Parental perception of their children's weight status, and its association with their nutrition and obesity knowledge

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Background: Worldwide the prevalence of overweight and obesity in children is escalating. Parents' recognition of overweight or obesity in their own children is very important for a successful intervention in these children. This study examined parental perception of their children's weight status, and its association with their knowledge on nutrition and obesity. Materials and Methods: This was a cross sectional study of parents with children aged 9 to 12 years, in a primary school of Kuala Lumpur. Parents responded to a self-administered questionnaire which contains parental perception of their child weight status as well as knowledge on nutrition and obesity. The parents' perception of the children's weight status was then compared with the actual measured weight status. Results: There were 204 parents who participated in the study. Parents were found to underestimate their child weight status and 38.2% were inaccurate in their perception. The mean score of knowledge on nutrition and obesity was 78.5±14.4; and this did not associate with the accuracy of their perception on the child weight status. Parents showed inadequate knowledge in food pyramid and preparation of low fat meals. Conclusion: The Malaysian Health Campaigns had resulted in overall good knowledge on nutrition and obesity in the parents except in few domains. However, this was insufficient to make the parents recognize the growing overweight and obesity problem in their children.

Key Words: overweight, obesity, children, parental perception, knowledge

INTRODUCTION

The prevalence of overweight and obesity in children continues to rise globally. In Malaysia, the reported prevalence of overweight children in Kuala Lumpur ranged from 5.8% to 17.8%.[1-3] Obese children had been shown to have a higher tendency to become obese adults and carry long term health consequences.[4] Early intervention is therefore required in these overweight and obese children. The treatment for overweight and obese children involves cooperation of both the children themselves and parents or caregivers. Parents are the vital promoter of healthy eating and lifestyle for their children.

Many studies especially in United Kingdom, United States and Australia have demonstrated that parents tend to underestimate their child's weight status. Around 32% to 89.5% of parents had an inaccurate perception of their child's weight status.[5-8] The parental inaccuracy of their child's weight status was associated with parents of low education and parents with female, older and higher BMI children.[5,7] Other factors which might affect parental misperception were cultural difference in the acceptance of large body habitus and inadequate understanding on overweight and its health implications.[7, 8]

The aim of this study is to determine whether the present Malaysian parental knowledge on nutrition and obesity would have any impact in their perception of their children's weight status. This information is useful in assessing the effectiveness of our messages especially on obesity and nutrition on parents. It is hopeful that with this information; the appropriate strategy can be addressed and planned in combating the overweight problem in children.

MATERIALS AND METHODS

A cross sectional study was done on parents of children aged 9 to 12 years, in a primary school in Kuala Lumpur. The age range was selected because overweight problem commonly begins during the pubertal period and this predicts adulthood obesity.[2, 4] Parents of children with medical problems or on medication that may affect the child weight status was excluded in order to reduce bias.

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In a self-administered questionnaire, parents (either mother or father) gave information on the socio-demographic profiles and rated their perception of child's weight as "underweight", "average", "overweight" and "markedly overweight". Additional questions were on nutrition and obesity which include the definition of a balance diet, identifying high calories food, practice to reduce fat in food, food to avoid by an obese person, obesity complications and practice to reduce weight. The correct responses were given one mark and the wrong or "do not know" answers were given a zero mark. The parental knowledge score was calculated from the percentage of correct answers.

The children weight and height were measured using a Seca-weighing machine with an attached height scale. Body mass index (BMI) of the children was calculated using the formula of weight in kilograms divided by height in meters squared. As there was no local BMI chart for children, this study used the Centers for Disease Control – United States BMI (CDC-US BMI) growth chart and International Obesity Task Force BMI cut-off points (IOTF BMI). The children's BMI values were plotted on the CDC-US BMI growth chart. Values below 5th percentile were considered underweight, and between 5th and 85th percentile were considered normal weight. Values above 85th percentile were further classified to overweight and obese using the IOTF BMI cut-off points.

Parents' perception of their child's weight status was then compared with the actual measured weight status. Parents who answered "underweight" were classified as perceiving that their child was "underweight", and those selected "average" were classified as perceiving their child as "normal". Parents answering "overweight" and "markedly overweight" were classified as perceiving their child as "overweight" and "obese" respectively. Parents' perception was correct if it matches perfectly with our weight status definition. Permission was obtained from the Federal Education Department and the school principal. For children with a weight problem, the parents were notified and referred to the local physician clinic.

Findings are shown as mean ± SD. Student's t test was used to detect any differences between quantitative variables. The kappa statistics was used to measure the agreement between the parental perception of the child's weight status and the actual measured weight status. The chi-square test was applied for detecting differences in proportions. The *p*-value was considered significant at less than 0.05. All statistical analyses were conducted using SPSS (Statistical Package for Social Studies) for windows version 12.0 (SPSS Inc. Chicago, USA).

RESULTS

A total of 204 parents participated in this study. Majority were Malays 198 (97.1%), 3 (1.5%) were Indians, 1 (0.5%) Indigenous and 2 (0.9%) immigrants. Based on the Malaysian Economic Planning Unit classification, 115 (56.4%) parents were classified in the low-income group, 66 (32.3%) parents in middle-income group and 23 (11.3%) parents in the high-income group. The mean age of the children was 10.8±0.91 years, and 112 (54.9%) were female. The mean age of the parents was 42.9 ± 5.9 years, and mothers contributed to 64.7% (132) of the respondents. Most of the parents were from lower education backgrounds, where 180 (88.2%) only had up to secondary school education levels.

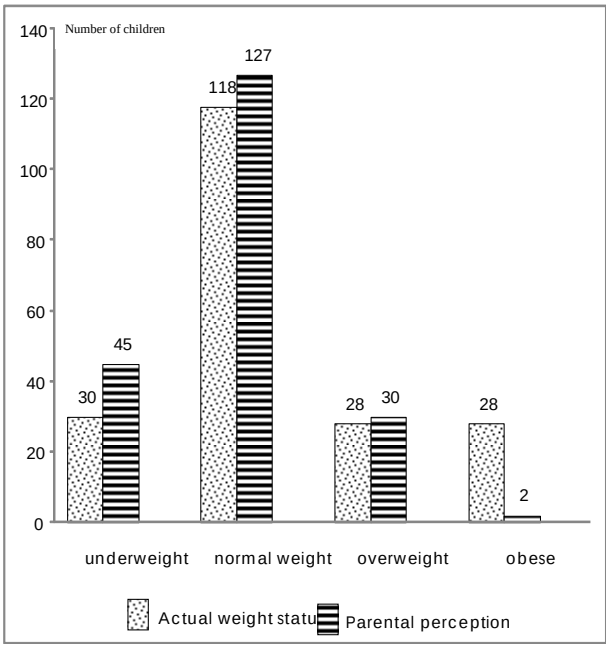

Figure 1. The comparison of the prevalence between the parental perceptions of the child weight status with the actual measured child weight status.

Overall, 57.8% had normal weight, 27.4% of the children were either overweight or obese and 14.8% of them were underweight. Most parents (62.3%) felt their child had normal weight, 22.1% felt that their child was underweight, 14.7% felt that their child was overweight and only 1% felt that their child was obese. The accuracy varied widely across the actual weight status. Parents were found to underestimate their child weight status (Figure 1) with 78 (38.2%) of the parents inaccurate in their perception. The kappa value between the parental perception and the actual measured child weight status was 0.347.

Younger parents and those with normal and underweight children showed a better perception of their child's weight status (Table 1). Parents' level of education and parental knowledge on nutrition and obesity were not significantly associated with their perception of child's weight status. The parental knowledge on nutrition and obesity was found to be good with the mean score of 78.5±14.4.

Looking into the detail responses for each of the items in the questions on nutrition knowledge (Table 2), 127 (62.3%) thought white rice as high in calorie and 109 (53.4%) thought an obese person need to avoid consuming white rice. In terms on cooking methods to reduce fat, many of them chose the wrong methods: 98 (48%) chose "deep fry chicken"; 90 (44.1%) chose "cook *rendang* which is beef cook in thick coconut milk gravy" and 92 (45.1%) chose **"**make oxtail soup". Many parents (149; 73%) did not know it is advisable to avoid buying food when hungry. The majority of the parents knew the health complications related to obesity but 51 respondents (25%) associated obesity with tuberculosis.

Table 1. The association between parental perceptions of their child's weight status with socio-demographic profiles and parental knowledge on nutrition and obesity. Values are in frequency (%), unless specified otherwise.

	Parental perceptions		
	Correct n = 126	Incorrect n = 78	*p*-value
Parent's gender			
Mother	82 (62.6)	49 (37.4)	0.74
Father	44 (60.3)	29 (39.7)	
Parent's age			
<40 years	60 (70.6)	25 (29.4)	*0.03
>40 years	66 (55.5)	53 (44.5)	
Parent's level of education			
Secondary & below	110 (61.1)	70 (38.9)	0.59
Tertiary	16 (66.7)	8 (33.3)	
Family income			
RM<1500	70(60.9)	45 (39.1)	0.43
RM1500-3500	39 (59.1)	27 (40.9)	
RM>3500	17 (73.9)	6 (26.1)	
Family medical history			
No	93 (66.0)	48 (34.0)	0.06
Yes*	33 (52.4)	30 (47.6)	
Child's gender	73 (65.2)	39 (34.8)	
Girl			0.27
Boy	53 (57.6)	39 (42.4)	
Child's age			
9-10 years	32 (58.2)	23 (41.8)	0.37
10-11 years	46 (68.7)	21 (31.3)	
>11 years	48 (58.5)	34 (41.5)	
Child's weight status			
Underweight	22 (73.3)	8 (26.7)	**0.001
Normal weight	93 (78.8)	25 (21.2)	
Over weight	11 (19.6)	45 (80.4)	
Parental knowledge score			
Mean (SD)	79.8 (13.9)	76.5 (15.0)	0.11

DISCUSSION

In comparison to Malaysian local studies over the last decade, overweight prevalence in children has tripling (27.4%).[2] Likewise over the same period of time, the underweight prevalence in the children had not improved (14.7%) despites social economic advancements in Malaysia.[3] The thought of overweight prevalence associated with affluent lifestyles might not be entirely true anymore. The majority of the participants in this study were from low to middle income population groups, and more than a quarter of the children were overweight. Although a generalization cannot be made for our total population but the high prevalence of overweight children is alarming.

More than a third (38.2%) of the parents had inaccurate perception of their child's weight status especially those with obese children. This result is comparable with studies in western population where parents of overweight children exhibited the lowest accuracy and underestimate their child's weight.[5-8] The kappa value was 0.347 which means only 35% of the parents had an agreement beyond chance with the health professionals' definition. Substantial numbers of parents in this study disagreed with the definition of overweight and obesity used by the health professionals. However the reasons of these parents' failure to accurately perceive their child's weight status were not examined.

Level of parental education did not have any significant association with their perception of the child's weight status. This result is different from earlier study in American population where mothers with low education were more likely to have an incorrect perception of their children's weight.[7] This could be due to the difference in the education systems between these two countries.

Parents with a good knowledge on the obesity problem and nutrition are more likely to have a lower prevalence of overweight children.[9] Conversely in this present study, despite the good obesity and nutrition knowledge in the parents, the prevalence of overweight children is substantially high and definitely higher compare to previous local studies.[1-3]

A good score on nutrition and obesity questions does not mean good knowledge in all domains of the questions. Any imbalances in knowledge domains are a potential source of problems in food habit.[10] The globalization of food markets had actually changed the parents' perception, even towards their staple food. In this study only 38% of the parents knew that white rice is low in calories and 53% thought that an obese person had to avoid white rice. Malaysians are adopting the affluent diet which is low in carbohydrates and fiber but high in fat.[11] Parents who are ignoring the recommendation of the food pyramid may have difficulty in providing healthy and balance menus for their children. Therefore, these parents need to be corrected; they need to know about the three concepts of a good diet that is variety, proportionality, and moderation of food.[3]

Table 2. Parental responses on nutritional and obesity knowledge questions

	Correct n (%)	Incorrect n (%)
Knowledge on balance diet	181 (88.7)	23 (11.3)
'Food high in calorie'		
Cooking oil	177 (86.8)	27(13.2)
White rice	77 (37.7)	127(62.3)
Margarine	160 (78.4)	44 (21.6)
Water melon	167 (81.9)	37 (18.1)
Plain water	173 (84.8)	31 (15.2)
Ice-cream	165 (80.9)	39 (19.1)
Chocolate cake	182 (89.2)	22 (10.8)
'*Roti canai'* (pharatta)	176 (86.3)	28 (13.7)
Orange	173 (84.8)	31 (15.2)
Water spinach	175 (85.8)	29 (14.2)
'Habits to reduce fat content in food'		
To remove skin of a chicken before cooking.	198(97.1)	6(2.9)
To remove fat in meat before cooking.	193(94.6)	11(5.4)
To remove excess oil from cooked food	184(90.2)	20 (9.8)
To dip fry food in sugar	127(62.3)	77 (37.7)
To dip fry chicken	106(52.0)	98 (48.0)
To boil or steam fish	146 (71.6)	58 (28.4)
To grill or bake fish	137 (67.2)	67 (32.8)
To cook '*rendang* ' (beef cooked with local spices in thick coconut milk gravy)	114(55.9)	90 (44.1)
To remove the fat layer from frozen food	131 (64.2)	73 (35.8)
To make oxtail soup	112(54.9)	92 (45.1)
'Food that an obese person has to avoid'		
'rendang' (beef cooked with local spices in thick coconut milk gravy)	175(85.8)	29 (14.2)
Plain water	176 (86.3)	28 (13.7)
Cake	191 (93.6)	13 (6.4)
White rice	95 (46.6)	109(53.4)
Water melon	169 (82.8)	35 (17.2)
Ice-cream	169 (82.8)	35 (17.2)
Chocolate	186 991.2)	18 (8.8)
Long bean	170(83.3)	34 (16.7)
Sweets	164(80.4)	40 (19.6)
Spicy thick coconut milk curry with meat	150 (73.5)	54 (26.5)
Diseases related to overweight and obesity		
Diabetes Mellitus	192(94.1)	12 (5.9)
Heart disease	190 (93.1)	14 (6.9)
Hypertension	194 (95.1)	10 (4.9)
Tuberculosis	153 (75.0)	51(25.0)
Habits to reduce weight		
Exercise	204 (100.0)	0 (0)
Not to overeat	195 (95.6)	9 (4.4)
Take slimming pill	166 (81.4)	38 (18.6)
To skip meal, lunch or dinner	140(68.6)	64 (31.4)
Eat at regular time everyday	186 (91.2)	18 (8.8)
To fast everyday	160 (78.4)	44 (21.6)
Don't buy food when hungry	55 (27.0)	149 (73.0)
Over eat in order to finish and not to waste food	170 (83.3)	34 (16.7)
Eat more fruits and vegetables	198 (97.1)	6 (2.9)
Attend slimming class	128 (62.7)	76 (37.3)

Many parents in this study made incorrect assumption that deep fry chicken, cooking oxtail soup and '*rendang'* which is beef cook in thick coconut milk gravy are methods to reduce fat. For a bowl of '*rendang*' which is a Malay dish, the calorie is estimated around 500-700kcal. The three dishes are closely related to the Malay food tradition and this could explain why most of the studied parents whom majorities are Malays chose the answer. At present a lot of dietary campaigns were focusing on western food as high in fat and calorie. Such campaigns unfortunately had neglected local food tradition and practice. Malaysian data had shown that there was an increase per capita availability and consumption of major macronutrients calories, fat and protein in the population over the last three decades.[11] '*Rendang*' which used to be festive dish served perhaps once or twice a year is now easily available in many food stalls and restaurants. Hence, it is vital to correct these unhealthy practices and it is indeed a challenging task as these local foods have been well accepted for many generations.

Children rely on their parents in providing healthy food choices.[12] This also implies that the current didactic nutritional education program to these parents might be inadequate especially in tailoring towards their own cul-

ture, thus need further improvement. Parents should replace the traditional fatty cooking methods with lower fat cooking methods instead. One of the ways of improving this is through the television program where healthy methods of cooking are taught directly to the public.

For behaviours to reduce weight, only 27% of the parents knew that it is best to avoid buying food when hungry. This could be due to the lifestyle changes. It is a norm for Malaysians especially those in cities like Kuala Lumpur, to eat out and they tend to do it while shopping.[11] Most parents in this study knew the diseases related to obesity. Unfortunately 25% thought that tuberculosis is associated with obesity. This could be due to their knowledge about tuberculosis was poor. It would be interesting to examine what tuberculosis means to these parents, and to correct their misperception if necessary.

In the knowledge-attitude-behaviour model, it is logical to think that by increasing the knowledge in health, there will be changes in attitude.[13] Motivation for behavioural change would only occur if one was perceived their vulnerability.[13] In this study, despite the good parental knowledge score on nutrition and obesity, parents demonstrated no statistical differences in their accuracy of perception on their child's weight status. Many of the parents failed to recognize the overweight and obesity in their own children. One of the possible reasons for this poor parental perception of their child weight status is that parents may be in denial and refused to admit of having the problem.

It would be interesting to study the perception of parents towards other children besides their own. In one study of 1098 parents conducted in California showed that parent's weight perception of their own children's was not the same as in determining the weight status of unrelated children. Parents were found to have better perception on the weight status of their own children.[14] A similar study among Malaysian parents would be of interest.

In conclusion, overall, parents showed a good knowledge on nutrition and obesity. Unfortunately, such a good knowledge was found insufficient to make them recognize the overweight problem in their children. In addition, these parental knowledge also needs to be improved with regard to the food pyramid and methods of preparing low fat meals. There is a need for the improvement of the methods and content of nutritional educational packages as well as efforts to improve parents' recognition of their child weight status.

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AUTHOR DISCLOSURES

All authors declare there is no conflict of interest in the writing of this manuscript. All authors also declare that all authors of this paper had no conflict of interest, financial or personal relationship with the studied respondents.

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家長對於孩子體重狀況之認知與他們的營養及肥胖相關知識之關聯

背景：全球兒童之過重及肥胖盛行率有逐步上升之情況。父母對於自己小孩過重或肥胖的認知，對這些兒童體位成功之干預相當重要。本篇探討家長對孩子體重狀況的認知與他們本身營養及肥胖知識之關聯性。材料與方法：本篇為橫斷性研究，受試者為吉隆坡一間小學中 9-12 歲兒童及其父母。使用自我管理問卷，讓家長回答對孩子體重情況之認知及營養與肥胖知識。將父母對於孩子體重狀況之認定與兒童實際測量之體重相互比較。結果：共有 204 位家長參與本研究，普遍低估了孩子的體重情況，其中 38.2%有不準確之認定。在營養與肥胖知識平均得分為 78.5 ± 14.4，但此與小孩體重狀況認定之準確性並無相關。家長在食物金字塔及低脂膳食製備之知識不足。結論：馬來西亞健康宣導，除了少數領域外，整體而言使家長具有良好之營養與肥胖知識，不過父母對日益增加的兒童過重及肥胖問題之認知仍然不足。

關鍵字：過重、肥胖、兒童、父母認知、知識