

ORIGINAL ARTICLE

Comparison of Paternal and Maternal Feeding Practices and Parenting Styles between Healthy Weight and Overweight or Obese Primary School Children

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ABSTRACT

Introduction: Parents play significant roles in developing the behaviour of their children towards food. However, mothers usually represent the parents of the children in previous studies, while fathers were left out and their contribution remained unknown. This study compared paternal and maternal feeding practices and parenting styles between overweight or obese (OW/OB) and normal weight (NW) primary school children. **Methods:** There were 419 children aged 10 to 11 from four randomly selected national primary schools being screened for their body weight and height. There were 105 children identified as OW/OB and matched with 105 NW children based on sex, age and ethnicity, whose both their parents were then recruited as study subjects. Parents reported their personal body weight and height, and completed a questionnaire on parenting styles and feeding practices. **Results:** There were 34.9% of children overweight and obese, and more than half of their fathers (66.5%) and mothers (52.5%) were overweight and obese. Both fathers and mothers of the OW/OB children perceived their children to be slightly heavier, but a majority of them perceived their children's body weight status less accurately and applied less pressure to eat. Fathers of the OW/OB children were more in the obese category, performed indulgent parenting style, perceived less feeding responsibility and applied less monitoring on their children, but not mothers. **Conclusion:** There were distinct differences in paternal and maternal feeding practices and parenting styles between OW/OB and NW children. Researchers should encourage fathers to involve in childhood obesity research instead of focusing on mothers.

Keywords: Obesity, Children, Parenting styles, Feeding practices

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INTRODUCTION

One of the main global public health issues is obesity, especially among children. Globally, there were 50 million girls and 74 million boys aged 5 to 19 with obesity in 2016, which is about a tenfold increment from 5 million girls and 6 million boys in 1975 (1). For Malaysia, the prevalence of obesity among children aged under 18 years old was 11.9% in 2015 (2), which was almost doubled compared to 6.1% in 2011 (3). By age group, children aged 5 to 9 had the highest prevalence of obesity (14.8%), as well as children aged 10 to 14 (14.4%) (2). Hence, it is essential to determine the possible factors behind this uprising prevalence of childhood obesity in Malaysia.

Childhood obesity is a disease that involves many factors

related to gene, behaviour and environment (4), whereby these factors can be linked to their parents. For example, children with both parents who are overweight have a higher tendency to become overweight or obese when compared to both parents who have healthy weights (5). Children consider their parents as role models during childhood period, and they learn the attitudes, beliefs and behaviours of their parents towards food and nutrition (6). Yet, it is important to highlight that parents with different parenting styles can affect the food intake, physical activity and sedentary behaviours of their children (7). For instance, parents who show more emotional support but did not control the food choices of their children tend to have children with higher body mass index (BMI) (8, 9), who further develop overweight and obesity in later life (10). However, the difference between the role of fathers and mothers remain unclear as most of the existing childhood obesity-related studies usually involved only mothers (9-12) to represent parents of the children. This situation further mystifies the contribution of fathers in preventing childhood overweight and obesity.

Historically, fathers play their roles in breadwinning or provisioning whereas mothers play their roles in caretaking and nurturing their children in the family (13). As a result, a majority of fathers work full-time hours and spend less time to feed or interact with their children as compared to mothers (14). A previous Malaysian study reported that Malay fathers in urban and rural families spent less time in nurturing and playing with their children compared to mothers (15). In the last few decades, this uneven perception regarding the role of fathers and mothers in the family has slowly diminished, due to the increasing number of working mothers (16), promotion of gender equality and intensive parenting ideologies (17). This attenuation opened up the opportunity for fathers to take up more caretaking role within the family (17). A recent qualitative study reported that fathers were sharing the caretaking responsibility with mothers through their involvement in grocery shopping, meal planning and encouraging their children to be more physically active (18).

As a result, there are growing evidences showing fathers have considerable influence towards their children (19), such as fathers' body weight status (20) and parenting style (21) are associated with their children's body weight status. When fathers exerted more restriction on their children, the children had high satiety responsiveness, which led to lower BMI (22). Besides, fathers who fed and looked after their children throughout infancy promoted better socioemotional behaviour in their children during childhood period (23). While the aforementioned evidences were obtained from Western countries, there are limited studies involving both parents in Malaysia to determine whether Malaysia is having a similar trend of changing roles between fathers and mothers within the family. Therefore, this study aimed to compare paternal and maternal body weight status, parenting styles and feeding practices between parents of overweight or obese and healthy weight primary school children.

MATERIALS AND METHODS

Study Design and Sampling

This cross-sectional comparative study was conducted in agreement with the Declaration of Helsinki and approved by the Ethics Committee for Research involving Human Subjects (JKEUPM), Universiti Putra Malaysia [FPSK(EXP14-nutrition)U021]. The permission to conduct this study in the four-selected national primary schools was acquired from the Malaysia Ministry of Education, the Department of Education in Selangor and the principals of the four-selected national primary schools respectively.

Four national primary schools were chosen by systematic random sampling based on a list of 64 national primary schools obtained from the municipal council. There were two classes from Grade 4 with children aged 10 and two classes from Grade 5 with children aged 11

being selected from each school. A random sampling of classes was not possible because the classes were assigned by the school authority. The primary school children must be a Malaysian citizen and aged 10 and 11 in order to be included in the current study. Children with special needs (e.g. Down syndrome or mentally retarded) or on medication (e.g. steroids) that might affect their body weight status were excluded from the current study. The response rate obtained was 80.9%, with 419 out of 518 consent forms signed and collected from both primary school children and their parents.

This study was divided into two phases. During the first phase of data collection, a body weight screening was conducted among 419 children to determine their body weight status, and 146 children (34.9%) were identified as OW/OB. Next, 146 NW children were randomly selected from the remaining 234 NW children, then matched with the selected OW/OB children according to their sex, age and ethnicity in order to minimise the influence of these variables on the result. All 146 match-paired children participated in the second phase of the study. During the second phase of data collection, two sets of parental questionnaires consisting questions on parental body weight status, parenting style and parental feeding practices were distributed to all children to be brought home and completed by their fathers and mothers respectively. Eventually, 105 match-paired children were included in the study while 41 match-paired children were excluded because the OW/OB children were absent during data collection days and parents did not return the questionnaires.

Anthropometric Measurements

Height and body weight of the children were measured in the first phase of data collection. Height was measured using SECA body meter to the nearest 0.1cm while body weight was measured using TANITA digital weighing scale to the nearest 0.1kg. BMI-for-age was calculated using the WHO Anthroplus Software and classified into different categories according to the WHO Growth Reference 2007 (24), which were severe thinness ($< -3SD$), thinness ($\geq -3SD$ to $< -2SD$), normal ($\geq -2SD$ to $< +1SD$), overweight ($> +1SD$) and obesity ($> +2SD$).

Socio-demographic Characteristics of Children and Their Parents

Information of the children, such as date of birth, sex and ethnicity were retrieved from the database of each school with the permission of their parents and the school authority. Meanwhile, both of their parents were required to provide information on their date of birth, educational level and monthly income.

Parental Body Weight Status

Both parents were required to report their recent body weight and height to determine their body weight status. Their BMIs were calculated and classified into different weight categories based on WHO Classification (25),

which were underweight (< 18.5 kg/m²), normal (18.5 to 24.9 kg/m²), overweight (25.0 to 29.9 kg/m²) and obesity (≥ 30.0 kg/m²).

Parenting Style

Parenting style was assessed using a 19-item Caregiver's Feeding Style Questionnaire (CFSQ) (8). Both fathers and mothers were asked to evaluate each item on a 5-point Likert scale (1 - never, 2 - rarely, 3 - sometimes, 4 - often and 5 - always). There were two dimensions, demandingness (control towards the child behaviour) and responsiveness (care and support towards the child) in this questionnaire. Demandingness was derived based on the mean total score calculated across all 19 items. Responsiveness was derived by adding up the score of seven child-centred items in the questionnaire, then divided by the total score of all 19 items. The higher the score, the higher the parents demand and response to their children.

Next, median split was applied on the mean scores for demandingness and responsiveness respectively (26), whereby parents were then categorised into four parenting styles, namely authoritative (high demandingness/high responsiveness), authoritarian (high demandingness/low responsiveness), indulgent (low demandingness/high responsiveness) and uninvolved (low demandingness/low responsiveness). The internal consistency reported for the two subscales (demandingness and responsiveness) in the present study were 0.90 and 0.77 for fathers and 0.90 and 0.74 for mothers.

Parental Feeding Practice

Parental feeding practice was assessed using the Child Feeding Questionnaire (CFQ) (27). It consisted of 31 items, which were made up from four factors that assessed parental perception (perceived responsibility, perceived child weight, perceived parent weight and concern about child weight) and three factors that measured parents' behaviour (parents' use of pressure to eat, restriction and monitoring). Both fathers and mothers were required to provide answer for each item on a 5-point Likert scale. Each factor had a different set of 5-point Likert scale, such as perceived child weight and perceived parent weight (1 - markedly underweight, 2 - underweight, 3 - normal, 4 - overweight and 5 - markedly overweight), concern about child weight (1 - unconcerned, 2 - a little concerned, 3 - concerned, 4 - fairly concerned and 5 - very concerned), perceived responsibility and monitoring (1 - never, 2 - rarely, 3 - sometimes, 4 - often and 5 - always), restriction and pressure to eat (1 - disagree, 2 - slightly disagree, 3 - neutral, 4 - slightly agree and 5 - agree). The total score was calculated for each factor by adding up every item score in the factor. The calculated mean score ranged from 1 to 5 for each factor. The higher the score, the higher the tendency of the parents to perform the feeding practices. The internal consistency reported in this study

ranged from 0.56 to 0.92.

Statistical Analysis

Data of the current study were analysed using IBM SPSS Statistics 22.0 (IBM Corp., Armonk, NY, USA). Bivariate analysis such as Pearson's chi-squared test and independent-samples t-test were used to compare the difference in parental body weight status, parenting style and parental feeding practice between OW/OB and NW children. The statistical significance level was set at P<0.05.

RESULTS

In the first phase of the study, the prevalence of overweight and obesity among children in the current study were 18.9% and 16.0% respectively (Fig. 1). In the second phase of the study, among the 105 match-paired children, almost all of them (99.0%) were Malay, 53.3% of them were female, with an average age of 10.6 ± 0.5 years old. There were no significant disparities in terms of educational level and monthly income between the parents of OW/OB and NW children.

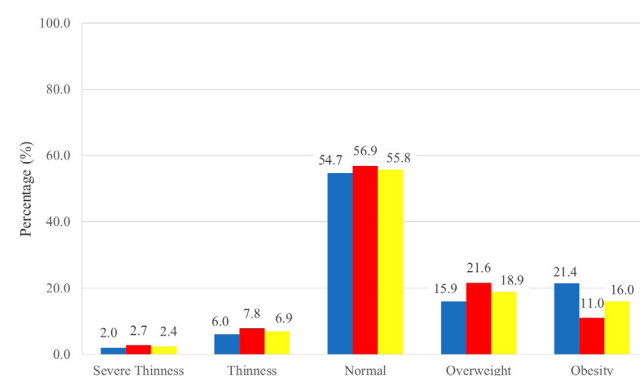


Figure 1: Distribution of Body Weight Status of Children by Sex (n = 419). Blue: Male (n = 201), Red: Female (n = 218), Yellow: Total (n = 419)

The overall prevalence of overweight and obesity for fathers and mothers were 66.5% and 52.5% respectively. As shown in Table I, there were more fathers in the overweight and obesity categories among OW/OB children (72.7%) compared to NW children (60.4%; $\chi^2 = 6.885$, P<0.05). However, there were about half of the mothers who were overweight and obese (OW/OB children: 56.8%; NW children: 48.4%; $\chi^2 = 1.304$, P>0.05).

There were more indulgent and uninvolved fathers among OW/OB children (61.9%) compared to fathers of NW children (42.0%) in the same parenting style categories (Table II). There were fewer fathers of OW/OB children (38.1%) having authoritative and authoritarian parenting styles compared to the NW counterparts (58.0%). The parenting styles were significantly different between fathers of OW/OB and NW children ($\chi^2 = 9.609$, P<0.05), but not between mothers of OW/OB and NW children ($\chi^2 = 4.006$, P>0.05).

Table I: Body Weight Status of Parents according to Child's Body Weight Status

Variables	Child's Body Weight Status		χ^2	t
	OW/OB n (%)	NW n (%)		
Body Weight Status of Father				
Non-overweight/obese: BMI \leq 24.9 kg/m ²	24 (27.3)	36 (39.6)	6.885*	
Overweight: BMI 25.0 to 29.9 kg/m ²	38 (43.2)	42 (46.1)		
Obesity: BMI \geq 30.0 kg/m ²	26 (29.5)	13 (14.3)		
Mean \pm SD (kg/m ²)	27.73 \pm 4.74	26.24 \pm 6.00		- 1.836
Body Weight Status of Mother				
Non-overweight/obese: BMI \leq 24.9 kg/m ²	38 (43.2)	47 (51.6)	1.304	
Overweight: BMI 25.0 to 29.9 kg/m ²	30 (34.1)	27 (29.7)		
Obesity: BMI \geq 30.0 kg/m ²	20 (22.7)	17 (18.7)		
Mean \pm SD (kg/m ²)	27.07 \pm 8.10	26.30 \pm 6.63		- 0.692

(OW/OB: n = 91; NW: n = 88)**

* p<0.05; ** 31 parents did not self-report their body weight and height

Table II: Parenting Style and Feeding Practices of Parents according to Child's Body Weight Status

Variables	Child's Body Weight Status		χ^2	t
	OW/OB n (%) / Mean \pm SD	NW n (%) / Mean \pm SD		
Parenting Style of Father				
Authoritative	16 (15.2)	27 (25.7)	9.609*	
Authoritarian	24 (22.9)	34 (32.3)		
Indulgent	39 (37.1)	22 (21.0)		
Uninvolved	26 (24.8)	22 (21.0)		
Parenting Style of Mother				
Authoritative	19 (18.1)	27 (25.7)	4.006	
Authoritarian	28 (26.7)	34 (32.4)		
Indulgent	35 (33.3)	28 (26.7)		
Uninvolved	23 (21.9)	16 (15.2)		
Parental Feeding Practices of Father				
Perceived Child Weight	3.16 \pm 0.33	2.92 \pm 0.29		- 5.571*
Perceived Parental Weight	3.15 \pm 0.29	3.07 \pm 0.34		-1.741
Concern about Child Weight	3.46 \pm 0.76	3.59 \pm 0.73		1.236
Perceived Feeding Responsibility	3.34 \pm 0.89	3.58 \pm 0.81		2.024*
Monitoring to Eat	3.38 \pm 1.02	3.67 \pm 0.96		2.090*
Restriction to Eat	3.41 \pm 0.56	3.51 \pm 0.59		1.277
Pressure to Eat	3.51 \pm 0.73	4.00 \pm 0.74		4.770*
Parental Feeding Practices of Mother				
Perceived Child Weight	3.14 \pm 0.32	2.91 \pm 0.26		-5.593*
Perceived Parental Weight	3.14 \pm 0.31	3.10 \pm 0.37		-0.865
Concern about Child Weight	3.61 \pm 0.73	3.69 \pm 0.73		0.791
Perceived Feeding Responsibility	3.80 \pm 0.77	3.78 \pm 0.71		-0.249
Monitoring to Eat	3.75 \pm 0.80	3.80 \pm 0.84		0.505
Restriction to Eat	3.62 \pm 0.63	3.67 \pm 0.55		0.672
Pressure to Eat	3.51 \pm 0.82	4.04 \pm 0.70		5.019*

(OW/OB: n = 105; NW: n = 105)

* p<0.05

Fathers of OW/OB children had a significantly higher mean score in perceived child weight ($t = - 5.571$, $P < 0.05$), but a significantly lower mean score in pressure to eat, such as control the amount and type of food ($t = 4.770$, $P < 0.05$) when compared to fathers of NW children (Table II). Similar results were found among mothers between OW/OB and NW children. Mothers of OW/OB children had a significantly higher mean score in perceived child weight ($t = - 5.593$, $P < 0.05$), but a significantly lower mean score in pressure to eat ($t = 5.019$, $P < 0.05$) compared to mothers of NW children.

When the perception of the parents towards their child's body weight status and the child's actual body weight status (Table III) were compared, only 26.7% and 13.3% fathers of OW/OB children who managed to perceive the actual body weight status of their children accurately compared to fathers of healthy weight children (81.0%). Similarly, there were only 23.3% and 4.4% mothers of OW/OB children who managed to perceive the actual body weight status of their children accurately compared to mothers of healthy weight children (81.9%). There were significant differences between fathers of OW/OB and NW children in terms of perceived feeding responsibility ($t = 2.024$, $P < 0.05$) and monitoring to eat ($t = 2.090$, $P < 0.05$), but not between mothers of OW/OB and NW children (Table II).

Table III: Parental Perception on the Child's Body Weight Status

Variables	Child's Actual Body Weight Status			χ^2
	Obese n (%)	Over- weight n (%)	Normal n (%)	
Perception of Father				
Underweight	1 (2.2) ^a	0 (0.0) ^a	16 (15.2) ^a	62.327*
Normal	8 (17.8) ^a	44 (73.3) ^a	85 (81.0) ^b	
Overweight	30 (66.7) ^a	16 (26.7) ^b	4 (3.8) ^c	
Obese	6 (13.3) ^b	0 (0.0) ^c	0 (0.0) ^c	
Perception of Mother				
Underweight	2 (4.4) ^a	0 (0.0) ^a	16 (15.2) ^a	61.932*
Normal	6 (13.3) ^a	46 (76.7) ^a	86 (81.9) ^b	
Overweight	35 (77.8) ^a	14 (23.3) ^b	3 (2.9) ^c	
Obese	2 (4.4) ^b	0 (0.0) ^c	0 (0.0) ^c	

(Obese: n = 45; Overweight: n = 60; Normal: n = 105)

* $p < 0.001$; Chi-square values were obtained after re-categorising the grouping

^a under-estimator; ^b correct-estimator; ^c over-estimator

DISCUSSION

In the present study, about one in three children were overweight and obese, which is slightly higher than the prevalence obtained in a local study with the similar setting (28). Besides, the prevalence of obesity was higher than the national prevalence of obesity among children reported in 2015 and 2011, which were 14.4% (2) and 11.8% (29) respectively. The high prevalence of childhood obesity highlights the need to determine

the role of parents in this obesogenic environment that surrounds their children.

While both parents of OW/OB children perceived their children to be slightly heavier as compared to parents of NW children, a majority of these parents perceived the body size of their OW/OB children incorrectly. Indeed, more than half of these parents perceived their OW/OB children as having a healthy weight, and a few of them thought that their OW/OB children were still underweight which is similar to previous studies (30, 31). Our study showed that both parents of OW/OB children applied less pressure or force to make sure their children finished their meal compared to those parents of NW children. It is important for parents to apply pressure on their OW/OB children in an appropriate situation. Otherwise, inappropriate use of 'pressuring' behaviour by parents might produce a counterproductive effect on their children. Children being pressured to eat have been associated with the development of negative feelings, such as anger and dislike towards certain foods (32).

Fathers of OW/OB children perceived less feeding responsibility and seldom monitor the food consumption of their children compared to fathers of NW children. However, no differences were found in mothers of OW/OB and NW children. The current findings contradicted with a previous study whereby both fathers and mothers who kept track on the food that their children consumed did not influence their children's body weight status significantly (33). Another past study showed different outcome whereby mothers were the ones with greater perceived feeding responsibility and monitoring in the family instead of fathers (11). Therefore, the current result can be more valuable if future studies can complement the paternal perceived feeding responsibility and monitoring scale with some behavioural measures or observations. This will provide a clearer picture on the level of participation among fathers in feeding and monitoring their children.

Parenting style of the father was also more prominent than mother according to the body weight status of their children. In Malaysian families, fathers tend to have more authority in decision-making compared to mothers (15). Therefore, authoritative fathers are more likely to give instructions to their children instead of advice (13, 14). Vollmer and Mobley reported that authoritative parenting style was related to healthier eating behaviours and lower risk of overweight among children (7). The present study showed that fathers of OW/OB children were more indulgent compared to fathers of NW children. Based on a past Malaysian study (34), parenting style of fathers was significantly correlated with the occupation of fathers. Fathers with non-army type of occupation had higher probability to practice permissive parenting style, which is similar with current study whereby most of the fathers had white collar jobs (34). Previous study conducted by Pinquart and

colleagues found that children with indulgent parents were linked with higher obesity risk through less healthy eating behaviours as well as being less physically active (35). Hence, parenting style of fathers plays a distinctive part in motivating their children to eat healthily and be physically active to prevent childhood obesity.

Similarly, there were significantly more fathers categorised as overweight and obese among OW/OB children compared to NW children, but not maternal. Fathers might influence their children's body weight status by role-modelling (36). Fletcher and colleagues (37) showed that there were more possibilities for fathers to have activities and playing time with their children compared to mothers, which strengthens the relationship between father and children and contributes in the development of their children. When fathers are motivated to take good care of their health, they might also encourage their children to follow their fathers and play together (38). Therefore, this father-child interaction through activities may protect the children from developing overweight and obesity. Nevertheless, fathers can lead by example so that children can observe and learn from their fathers in every aspect, such as habits of eating healthily and exercise to maintain body weight status in the healthy range (18).

There were a few limitations in the present study. Firstly, the respondents recruited were Malays, in which the findings obtained were unable to represent the multi-racial composition of Malaysia. In Malaysia, the foremost ethnic group is Malay, followed by Chinese and Indian. Secondly, the researchers were unable to interview the parents on their parenting styles and parental feeding practices due to the unavailability of the parents and logistic issues of schools during data collection. Thus, data collected from the parents were only on their self-reported body weight and height, as well as the self-administered questionnaire, which might be a potential source for recall bias. Lastly, the causal relationship between parental body weight status, parenting styles, feeding practices and body weight status of children was unable to be determined due to the current study design. However, this is the first study which highlighted the difference in paternal and maternal role among OW/OB children, as well as NW children in a Malaysian setting. Hence, the current findings may serve as baseline information for future research and intervention involving parents.

CONCLUSION

Both fathers and mothers of NW children perceived the body weight of their children better and controlled the type and amount of food consumed by their children better than those of OW/OB children. In addition, fathers of NW children were found to have normal body weight status, and practised authoritative parenting style, greater feeding responsibility and greater monitoring

compared to fathers of OW/OB children. Fathers and mothers with the aforementioned parenting style and feeding practices have the upper hand in shaping their children with healthy body weight status. As fathers are getting more involved in the caretaking role within the family, it is important for health care professionals to encourage the involvement of fathers in future research or intervention programmes related to childhood obesity rather than only focusing on mothers.

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