

Parental perception of children's weight status and sociodemographic factors associated with childhood obesity

Noor Shafina Mohd Nor, MB BCh BAO BMedSc^{1,2}, Abdul Rasyid Ariffien, MBBS³, Anis Siham Zainal Abidin, MMed(Paed)¹, Nor Izwah Mohamed Kamarudin, MBBS³, Jamaluddin Mohamad, MBBS⁴

¹Department of Paediatrics, Faculty of Medicine, Universiti Teknologi MARA (UiTM), Sungai Buloh Campus, Selangor, Malaysia, ²Institute for Pathology, Laboratory and Forensic Medicine (I-PPerForM), Universiti Teknologi MARA (UiTM), Sungai Buloh, Selangor, Malaysia, ³Department of Paediatrics, Sungai Buloh Hospital, Selangor, Malaysia, ⁴Faculty of Medicine & Biomedical Sciences, MAHSA University, Selangor, Malaysia

ABSTRACT

Introduction: The trend of childhood obesity is on the rise and hence leading towards the increase in obesity related complications. Early recognition of obesity in children and accurate parental perception of the status of the weight of their children is vital. Furthermore, identification of sociodemographic risk factors contributing to obesity is crucial in order to identify children who are in the risk group and thus prevent potential complications. This study is aimed to establish the parental perception of the status of the weight of their children. Secondly, the study also to identify the sociodemographic risk factors associated with obesity in children.

Methods: This was a cross-sectional study involving 245 children from 5 to 12 years of age. Following informed consent, the children were classified into either normal (body mass index (BMI) >5th to <85th percentile), overweight (BMI >85th to <95th percentile) or obese (BMI >95th percentile) groups. Parents responded to questionnaires which assessed their perception and sociodemographic factors.

Results: A total of 157 participants (64.1%) had normal BMI while 41(16.7%) were overweight and 47(19.2%) were obese. More parents of overweight and obese group had misperceptions of their children's weight status ($p=0.001$). Families with higher household income, children with higher birth weight, higher education of mothers and family history of obesity and type 2 diabetes had increased risk of higher BMI among their children ($p=0.029$, $p=0.013$, $p=0.041$ and $p=0.001$ respectively).

Conclusions: Most parents of either overweight or obese children had inaccurate perception of the status of weight of their children. Higher household income, birth weight and education level of the mothers as well as history of diabetes and obesity in the family are associated with increased risk of childhood obesity.

KEY WORDS:

Obesity, overweight, parental perception, socio-demographic factor, children

INTRODUCTION

The trajectory of childhood obesity is currently following a sharp rise and the obesity rates in children has doubled and even quadrupled in adolescents in the last 30 years.^{1,2} A large survey conducted in China involving a total of 145, 078 kindergarten children showed that the prevalence of obesity had increased from 8.8% in 2006 to 10.1% in 2010, followed by a plateau trend until 2014.³ Malaysia is not excluded in this occurrence and has been shown to follow a similar worldwide trend.⁴ A recent study in Malaysia found that the prevalence of obesity and overweight in children was as high as 19.9%.⁵

Consequently, the rates of obesity related complications like pre-diabetes and type 2 diabetes mellitus (T2DM) in children are also on the rise.⁶ Center for Disease Control and Prevention (CDCP) has highlighted that childhood obesity is a proven risk not only for diabetes, cardiovascular diseases, breathing problems and joint problems, but also social and psychological problems.⁷

In order to prevent obesity related co-morbidities in children, early recognition of overweight and obesity is vital. Accurate parental perception of their children's weight status is crucial to facilitate early referral to medical professionals and hence, expedite lifestyle modifications. Some studies have reported misperception of children weight status by their parents.^{8,9} However, studies from Asian region are still scarce.

Studies have shown that childhood obesity is caused by the interplay between genetics and environmental factors.¹⁰ Parental obesity, education status of parents, high family income and formula feeding are among the factors described to be associated with childhood obesity.¹⁰⁻¹² Hence, apart from having accurate perception of status weight, early identification of sociodemographic risk factors associated with childhood obesity is also imperative to identify the risk group among children and help healthcare providers in the prevention of obesity related complications in later life.

Therefore, the objective of the study was to establish the parental perception of the status of weight of their children. Secondly, the study also aimed to identify the

This article was accepted: 15 February 2020

Corresponding Author: Dr. Noor Shafina Mohd Nor

Email: drshafina@salam.uitm.edu.my

sociodemographic risk factors associated with obesity in children.

METHODS

This was a cross-sectional study involving 245 children aged 5 to 12 years. They were recruited between September 2017 to February 2018. Parents who accompanied the children were given a set of questionnaires to be answered. This study obtained the institutional ethical approval and the approval from the National Medical Research Register of Malaysia.

Sample size and study population

The sample size was calculated using OpenEpi Software with the power of study of 80% with precision of 0.5. Patients admitted to Hospital Sungai Buloh were recruited into this study based on convenience sampling. Children admitted to the intensive care unit were excluded. Children requiring support to mobilize including those with Cerebral Palsy and Spina Bifida and those with comorbidities which may contribute to obesity such as genetic syndrome, for example Prader-Willi syndrome and Down syndrome, endocrine problem such as hypothyroidism and Cushing syndrome, and on medication such as steroids were also excluded. Parents of each participant provided their written informed consent prior to participation.

Data

The body weight and height of subjects were measured by one trained researcher via standardized methods. Weight and height were measured to the nearest 0.1kg and 0.5cm respectively in light clothing, without shoes using a pre-calibrated SECA digital scale and stadiometer. Their Body Mass Index (BMI) was calculated as weight in kilograms divided by height in meters squared. CDC BMI-to-age gender-specific percentile charts were used. Overweight (OW) was defined as BMI equal or more than 85th percentile but less than 95th percentile while obese (OB) was defined as BMI equal or more than 95th percentile.¹³ Each participant was classified into either normal (BMI >5th percentile to < 85th percentile), overweight group (BMI > 85th percentile to < 95th percentile) or obese group (BMI > 95th percentile).

The questionnaire included questions regarding the socioeconomic background (household income, parents' highest education background), birth weight, history of prematurity and whether the child was breastfed and the duration as well as the family history of obesity and diabetes. Each parent was required to guess the status of the weight of their children either as "normal weight" or "overweight". To simplify the assessment, we did not include the "obese" category. Questionnaires were provided in English and Malay language.

Statistical analysis

SPSS version 23.0 (IBM Corporation, Chicago, IL, USA) was used to perform the data analysis. Chi-square test was used for categorical data while t-test was used for continuous data. Multivariate analyses of the predictors of obesity were performed to compare between obese/overweight groups with normal group using binary logistic regression. The variables

were first entered into the univariate analysis, and subsequently the variables that were significant ($P \leq 0.05$) were then entered into a multiple logistic regression model. Differences among groups were analyzed using one-way ANOVA. Results are presented as mean + Standard Deviation (SD) and the level of significance was set at p value < 0.05 .

RESULTS

A total of 245 children were enrolled into the study with a mean age of 7.9 ± 2.1 years. Almost half of them were males (49%) and the rest were female (51%). Majority of the sampled population were Malays (83%) followed by Indians (5%) and Chinese (4%). A total of 157 children (64.1%) were grouped into normal BMI group, 41 (16.7%) OW group while 47 (19.2%) OB group. They were matched for gender, age and races ($p > 0.05$) (Table I).

Significantly more parents of OB and OW group had wrong perceptions of the status of the weight of their children ($p=0.001$). A total of 53.2% and 80.5% of the parents with children who were obese and overweight respectively had misperception that their children had normal weight. Sub analysis according to different gender also showed similar significant findings (Table II).

Families with higher household income appeared to have children with significantly higher BMI compared to those families with lower income ($p=0.01$). Parents with family history of obesity or diabetes raises the risk of higher BMI in children ($p < 0.001$). Higher birth weight and the education level of mothers are also shown to be associated with obesity ($p=0.013$ and 0.041 respectively). When comparing between the two groups (normal vs obese/overweight), our result showed that there was more than threefold increase in obese/overweight children in those with family history of obesity, (AOR=3.410, 95% CI: 1.528, 7.607). Furthermore, report on family history of diabetes and higher birth weight had almost two times likelihood to lead to childhood obesity (AOR=1.859, 95% CI: 1.037, 3.331 and AOR=1.894, 95% CI: 1.133, 3.165 respectively). The likelihood that higher maternal education level and higher household income leads to overweight were 1.7 and 1.5 times higher (AOR=1.742, 95% CI: 1.027, 2.954 and AOR=1.437, 95% CI: 1.091, 1.893 respectively). However, factors such as education level of the fathers, history of breastfeeding including the duration and history of prematurity were not significantly different between the groups (Table III).

DISCUSSION

The accurate parental perception of the status of the weight of their children is the initial vital step in seeing general practitioners early. Wrong perception will hinder early referral and may lead to future obesity and associated comorbidities for example type 2 diabetes mellitus and hypertension. Our study assessed the parental perception of the status of the weight of their children among children aged 5 to 12 years of age. The growing interest in the importance of this subject is also recently highlighted in a review by Hochdorn et al.¹⁴

Table I: Baseline characteristics of subjects according to groups

	OB(N=47) [n (%)]	OW(N=41) [n (%)]	Normal (N=157) [n (%)]	p Value
Age				
Mean in months (SD)	102.65(25.87)	95.24(27.29)	92.97(25.05)	0.075
Gender				
Male	27(57.4%)	19(46.3)	72(45.9%)	0.306
Female	20(42.6%)	22(53.7)	85(54.1%)	
Race				
Malay	35(74.4%)	35(85.4%)	135(86%)	0.208
Chinese	3(6.4%)	4(9.8%)	5(3%)	
Indian	7(14.9%)	1(2.4%)	12(8%)	
Others	2(4.3%)	1(2.4%)	5(3%)	

OW = overweight
OB = obese

Table II: Parental perception of child's weight status among groups

Parental perception of child's weight status	OB(N=47)	OW(N=41) [n (%)]	Normal (N=157) [n (%)]	p Value [n (%)]
All				
Overweight	22(46.8%)	8(19.5%)	3(1.9%)	0.001
Normal	25(53.2%)	33(80.5%)	154(98.1%)	
Male				
Overweight	13(48.1%)	5(26.3%)	0(0%)	0.001
Normal	14(51.9%)	14(73.7%)	72(100%)	
Female				
Overweight	9(45.0%)	3(13.6%)	3(3.5%)	0.001
Normal	11(55.0%)	19(86.4%)	82(96.5%)	

OW = overweight
OB = obese

Table III: Comparison of sociodemographic factors between groups

	OB (N=47) [n (%)]	OW (N=41) [n (%)]	Normal (N=157) [n (%)]	AOR	p Value	95% CI for Exp(B)
Mothers Education				1.742	0.041	1.027, 2.954
Primary/Secondary	15(31.9%)	20(48.8%)	86(54.8%)			
Tertiary	32(68.1%)	21(51.2%)	71(45.2%)			
Fathers Education					0.946	
Primary/Secondary	25 (53.2%)	22(53.7%)	88(56.1%)			
Tertiary	22 (46.8%)	19(46.3%)	69(43.9%)			
Household income				1.437	0.01	1.091, 1.893
<2000	6(12.8%)	6(14.6%)	43(26.8%)			
2000-4999	16(34.0%)	15(36.6%)	69(43.9%)			
5000-10000	11(23.4%)	9(22.0%)	25(15.9%)			
>10000	14(29.8%)	11(26.8%)	20(12.7%)			
Report of diabetes in family	19(40.4%)	26(63.4%)	44(28.0%)	1.859	<0.001	1.037, 3.331
Report of obesity in family	11(23.4%)	12(29.3%)	12(7.6%)	3.410	<0.001	1.528, 7.607
Breastfeeding	42(89.4%)	39(95.1%)	140 (89.2%)		0.467	
Breastfeeding duration (mean in months + SD)	11.9+12.6	14.6+10.0	14.1+10.1		0.392	
Prematurity	5 (10.6%)	5(12.2%)	12 (7.6%)		0.632	
Birth weight (kg + SD)	3.07+0.60	3.17+0.50	2.93+0.55	1.894	0.031	1.133, 3.165

OW = overweight
OB = obese

Our study found that a staggering 80.5% and 53.2% of the parents from the group of overweight and obese children respectively had inaccurate perception of the status of the weight of their children and often underestimate the BMI of their children. A multicenter study involving eight European countries showed that 63% parents of overweight children had misperception that their children had normal weight.¹⁵ Gregori et al reported even higher rate of misperception among parents with a total of 89% of children with overweight and 52% of children with obesity perceived to have normal weight by their parents.¹⁶ However, there were previous studies from countries in the West that reported lower percentage of misperception among parents of overweight and obese children.¹⁷⁻¹⁸ These differences may be due to the different cultural background of the different countries and what was perceived as healthy.

To the best of our knowledge, there is only a single previous report from Malaysia that studied the maternal perception on the status of childhood weight.¹⁹ This study also reported lower percentage of misperception compared to our study. However, the above study was performed more than 10 years ago and in a population of children of older age groups compared to ours. The interesting trend of higher misperception among parents of children who are overweight and obese demonstrated in this study could possibly be explained by the increasing prevalence of obesity worldwide. With more children being overweight and obese now, parents may perceive their children to have normal weight. Consequently, this will lead to late presentation to the healthcare professionals since it is not recognized as an issue of concern. Apart from this, another possible reason for poor parental perception of the status of weight of their child is that parents may be in denial and refuse to admit that their children have weight issue.¹⁹ Al-Hassan et al reported that the age of the child was significantly associated with parental misperception of their actual status of weight of the child.²⁰ The ability of mothers to detect if their children as being overweight is perceived to be among the key to the prevention of obesity in children.²¹ Hence, some trials are underway to help improve the accuracy of parental perception of the of the status of the weight of their child.²²

This study also examined the sociodemographic risk factors associated with childhood obesity. Early identification of these factors may assist general practitioners especially to identify children who are at higher risk of being obese and allow to initiate the necessary lifestyle modifications. We found that families with higher total household income had children with significantly higher BMI. The obese group showed higher percentage of higher household income compared to overweight and normal group. Our study is in agreement with a few previous studies.²³⁻²⁵ This finding is however in disagreement that of Min et al who reported children who experienced poverty were more likely to have adverse BMI trajectory.²⁶

We also found that having report on family history of diabetes or obesity raises the risk of children to have higher BMI compared to those without any family history. This highlights the known importance of taking a thorough history and identifying the children of higher risk due to their

family history of obesity. However, interestingly more children in the OW group had family history of diabetes and obesity compared to the OB group. Previous study also highlighted the association of maternal obesity with young onset of childhood obesity.²⁷ Reuter et al reported higher obesity risk in children with overweight father and maternal grandmother.²⁸ This finding emphasizes the importance of targeting not just the child but the whole family in ensuring an effective management of obesity.

We also found that higher birth weight of the child increased the likelihood of obesity in later childhood. This result is consistent with some previous studies.²⁹ One meta-analysis by Yu et al showed that birth weight of more than 4kg was associated with higher risk of obesity (odds ratio [OR], 2.07; 95% confidence interval [CI], 1.91–2.24) compared with subjects with birth weight \leq 4kg³⁰. However, our study still showed that the mean weight for all groups were still within the normal weight.

Breastfeeding is strongly advocated to reduce risk of obesity in later life. However, our study showed that history of breastfeeding including the duration was not significantly different between the groups. Our study was inconsistent with findings by Wang et al which showed that breastfeeding at 1 and 6 months was associated with reduced risk of childhood obesity in the United States.³¹ However, this difference may not be comparable with our study considering the different rate of breastfeeding among mothers in different parts of the world.

Furthermore, we also found that the education level of mothers but not that of fathers to be significantly associated with obesity in their children. A study in children from Pakistan also found that higher parental education at college or higher level as compared to high school-level or lower were associated with higher BMI.³² On the contrary, Hajian-Tilaki et al reported that higher parental education is inversely associated with obesity in children.¹¹ Our study also reported that history of premature birth is not significantly associated with obesity in children.

However, the perceived limitation in our study is its' cross-sectional nature, necessitating proper prospective studies in the future. Some of the data in our study were from recall of parents, for example the family history of diabetes and obesity which may not be very accurate. Multicenter studies with larger number of participants is required to better assess the association.

CONCLUSION

In conclusion, most parents of either overweight or obese children have wrong or inaccurate perception of the of status the weight their children. The awareness of parents of their children actual weight should be improved to necessitate early referral to general practitioner and reduce future obesity comorbidities. Factors such as higher household income, higher birth weight and family history of diabetes and obesity are associated with increased risk of childhood obesity.

ACKNOWLEDGEMENTS

The authors would like to acknowledge participants in the study and the parents for their commitments. NSMN was a recipient of the Lestari Grant from the Universiti Teknologi MARA (UiTM) (600-RMI/DANA 5/3/LESTARI (60/2015)).

The authors declare that there is no conflict of interest regarding the conduct of the study and the publication of this paper.

ETHICAL APPROVAL

Ethical approval was obtained from the UiTM Ethics committee (600-IRMI(5/1/6) and Ministry of Health Malaysia Medical Research Ethic Committee (KKM/NIHSEC/P18-518(10)).

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