Maternal concern and perceptions of overweight in Australian preschool-aged children

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ABSTRACT

Objective: To assess maternal concern about overweight in Australian preschool-aged children and factors predicting maternal concern about children's current and future weight status.

Design: Cross-sectional survey of child's body mass index and parent questionnaire.

Setting: Metropolitan Melbourne, Victoria, 2002.

Participants: A community-based cohort of 324 4-year-old children and their parents.

Main outcome measures: Mothers' reports of concern about the child's current and future weight status, and perceptions of the child's weight, diet and activity relative to their peers were compared with the child's measured weight status, and parent and child characteristics.

Results: The prevalence of overweight or obesity was 19%, but only 5% of mothers indicated concern about their child being currently overweight, while 16% worried their child would become overweight. Over 70% of mothers of overweight children saw them as being of similar weight to their peers. Most mothers saw their children as being equally or more active than other children and having a diet at least as healthy as their peers. Overweight daughters were more likely to elicit maternal concern about current weight than overweight sons (relative risk, 4.6; 95% CI, 1.1–19.8). Mothers were more likely to worry about their child's potential for future overweight if they or the child's father were overweight.

Conclusions: Despite mounting public concern about childhood obesity in Australia, most mothers surveyed were not concerned about their child's weight, and many mothers did not perceive their overweight children as different from their peers. This may have implications for interventions that rely on acknowledgement of child overweight as a first step to change.

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The prevalence of overweight and obesity in Australian preschool-aged children has doubled in the past 10–15 years and is continuing to rise.[1,2] Studies in the United Kingdom, United States and Australia have provided a convincingly consistent message that, on an individual level, parents often do not accurately perceive overweight in their children, and report low levels of concern,[3-7] which may be lowest when children are young, especially for boys. This is important because, during the preschool and early school years, the course of the body mass index (BMI) curve changes from a state of progressive decline to steady increase,[8] and this may be the best time to maximise the child's chances of staying on a healthy growth trajectory. It is also the period during which the family environment plays an important role in health and development.[9]

Previously published data were collected largely while evidence of the obesity epidemic mounted, and levels of individual concern might be expected to have risen as a result of the massive and sustained increase in publicity. Further, no published papers have reported the level of concern expressed by Australian parents when their preschool-aged children are overweight, predictors of this concern, or parental perceptions of the weight status, nutrition and activity of their overweight children relative to their peers.

Our study aimed to investigate each of these issues, to further inform Australian clinical and public health approaches to the problem of overweight and obesity in young children.

METHODS

Our study was a cross-sectional survey of healthy 4-year-old children and their parents.

Participants

Participants were recruited from an established cohort of 493 first-born infants whose parents participated in an earlier longitudinal study, the PEAS (Parent Education and Support) Program, from 1998 to 2001.[10] Families were initially enrolled from maternal and child health centres in three local government areas (one inner urban, one suburban and one semi-rural) in Melbourne, Victoria, when the children were 2 weeks of age. They were followed closely for 2 years. From mid-2002, all contactable PEAS families still living in Melbourne (n = 402) were invited to take part in a longitudinal follow-up study, beginning at the child's fourth birthday; 341 families (85%) agreed to participate.

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The study was approved by the Ethics in Human Research Committee at the Royal Children's Hospital, Melbourne, and parents provided written informed consent.

Data collection

Children were measured by trained research staff according to a standardised protocol.[11] Height was measured to the nearest 0.1 cm with an Invicta portable stadiometer (Oadby, Leicester, UK), and weight to the nearest 0.1 kg on digital scales (TI-THD 646, Tanita, Tokyo, Japan), without shoes and in light clothing.

In a written questionnaire, mothers responded to the following items using a 5-point Likert scale (range "disagree a lot" to "agree a lot"): "I am worried my child is overweight right now"; "I am worried my child will become overweight"; and "I am worried my child is underweight right now".[12] Responses were dichotomised to "agree" or "disagree", with the neutral answer classified as "disagree".

1 Characteristics of children in the study sample and their parents

	Children ($n = 324$)	Mothers ($n = 324$)	Fathers ($n = 297$)
Mean age in years (SD)	4.2 (0.2)	34.1 (4.1)	36.6 (5.6)
Body mass index (kg/m^2)			
Median	16.3	23.7	25.9
Interquartile range	15.5–17.2	21.4–26.6	23.9–28.4
Mean *z* score (SD)	0.5 (0.9)	nr	nr
Weight category*			
Non-overweight	261 (81%)	201 (64%)	106 (39%)
Overweight	54 (17%)	78 (25%)	125 (46%)
Obese	9 (3%)	37 (12%)	39 (14%)
Education level*			
Did not complete year 12	nr	66 (21%)	129 (43%)
Completed year 12 only	nr	120 (38%)	68 (23%)
Tertiary or postgraduate degree	nr	129 (41%)	100 (34%)
Country of birth*			
Australia	nr	278 (87%)	244 (82%)
United Kingdom	nr	26 (8%)	33 (11%)
Other	nr	15 (6%)	20 (7%)

* May not add to total because of missing data. nr = variable not relevant. ◆

Mothers also rated their child on 5-point scales "in comparison with other children his/her age" with regard to weight ("much thinner" to "much more overweight"), healthiness of diet ("much less healthy" to "much more healthy"), amount of food eaten ("eats much less" to "eats much more") and activity level ("much less active" to "much more active"). These variables were collapsed to three categories ("less", "about the same" or "more").

The mother reported her own height and weight and that of the child's biological father, and provided demographic information, including parental education level.

Statistical analysis

Child BMI was transformed to a *z* score according to the UK 1990 Growth Reference.[13] Overweight and obesity status was determined from International Obesity Task Force cut-points, using software that calculated exact cut-points for sex and age through linear interpolation.[14,15] The overweight and obese categories were combined for further analyses. In the absence of international standard cut-points to define underweight, the proportion of children below the 5th and 10th percentiles for BMI (*z* scores less than –2.0 and –1.28) were also identified.

Maternal and paternal BMI were categorised as non-overweight (< 25 kg/m^2), overweight (25 to < 30 kg/m^2) or obese (≥ 30 kg/m^2). The number of parents per household who were overweight or obese was calculated for those with data on both biological parents.

Student's *t* test or its non-parametric equivalent were used to determine differences between continuous variables. Bivariate relationships between categorical variables were examined using χ^2 tests, or Fisher's exact test where the expected cell count was less than 5 in more than 20% of cells. Risk ratios were calculated for predictors of concern for child weight and concern for the child becoming overweight. Analyses were repeated after stratifying children by weight category. Statistical analyses were carried out using Stata version 8.0 software (StataCorp, College Station, Tex, USA).

RESULTS

Complete height, weight and questionnaire data were available for 324 children (48% male). These 324 did not differ significantly in sex distribution, maternal country of birth or area of recruitment from the 169 children in the original study who were lost to follow-up. Characteristics of the children with follow-up and their parents are summarised in Box 1. Sixty-three children (19%) were classified as overweight or obese, with similar prevalence in boys and girls. Most (92%) children lived with both biological parents, and three-quarters lived with at least one overweight parent.

Maternal concerns and perceptions

Box 2 summarises maternal responses regarding concern about their child's weight and perceptions of their child relative to their peers, according to the child's measured weight status. Only 15 mothers (5%) reported concern that their child was currently overweight, including 11 of the 63 mothers whose children were actually overweight or obese. Another 40 of these 63 mothers (63%) strongly disagreed that they were concerned about their child's current weight. Concern that a child would become overweight in the future was reported by 53 mothers (16%), over three times more often than concern about a child's current weight. Although no children in our sample had a BMI below the 5th percentile, and only five (2%) below the 10th percentile, 27 mothers (8%) indicated concern that their child was currently underweight; these included 10 (37%) whose child had a BMI at or above the 50th percentile.

Box 3 shows the distribution of child BMI *z* scores according to level of maternal concern about current and future overweight, respectively. For concern about current overweight, there was a significant difference in median BMI *z* score between the concerned and not-concerned groups (concerned, 1.53; not concerned, 0.42; Mann–Whitney U test $P < 0.001$). However, 52 (17%) of those not concerned had children who were overweight or obese. Concern for future overweight encompassed a wider range of BMI *z* scores, with mothers of non-overweight children also expressing this concern.

Most mothers (68%) felt their children were of a similar weight to their peers, while 24% felt their child was thinner, and 8% that their child was more overweight (Box 2). Of the 63 mothers with overweight children, 71% reported their children to be of similar weight to their peers. Few mothers reported they felt their child's diet was less healthy or that their child was less active than their peers, and this did not differ by child weight status. However, more mothers with overweight or obese children perceived that their child ate more than their peers.

Associations with child's weight status

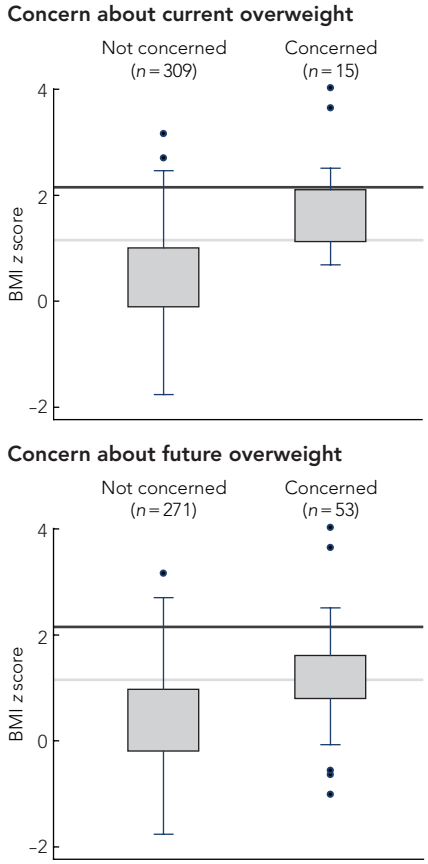
Maternal concern about current overweight was significantly related to child weight

2 Maternal responses to questionnaire according to child's weight category

Questionnaire item	Non-overweight ($n = 261$)*	Overweight or obese ($n = 63$)*	P
Concerned that child is overweight now	4 (2%)	11 (18%)	< 0.001
Concerned that child will become overweight	29 (11%)	24 (38%)	< 0.001
Concerned that child is underweight now	26 (10%)	1 (2%)	0.04
Perception of child's weight compared with peers			
Thinner	76 (29%)	1 (2%)	< 0.001
Similar	176 (68%)	45 (71%)	
More overweight	8 (3%)	17 (27%)	
Perception of child's diet compared with peers			
Less healthy	31 (12%)	6 (10%)	0.60
About the same	112 (43%)	24 (38%)	
More healthy	118 (45%)	33 (52%)	
Perception of child's activity level compared with peers			
Less active	17 (7%)	3 (5%)	0.80
About the same	127 (49%)	34 (54%)	
More active	117 (45%)	26 (41%)	
Perception of amount child eats compared with peers			
Eats less	55 (21%)	7 (11%)	0.01
About the same	165 (64%)	37 (59%)	
Eats more	40 (15%)	19 (30%)	

*May not add to totals because of missing data. ◆

3 Box and whisker plot of child body mass index (BMI) *z* score by maternal concern about overweight



Grey and black lines indicate International Obesity Task Force cut-points for overweight and obesity, respectively.[15] ◆

status (χ^2 test, $P < 0.001$). Box 4 shows bivariate associations between child and parent factors and maternal concern about current overweight and future overweight. When the analyses were stratified according to the child's weight status (overweight or obese versus non-overweight), mothers of overweight daughters were more likely to report concern that their child was currently overweight than those with overweight sons (risk ratio [RR], 4.6; 95% CI, 1.1–19.8).

Concern that a child would become overweight in the future was strongly related to the number of overweight parents as well as the child's current weight status (χ^2 test, $P < 0.001$). After stratifying by weight status, the significant relationship with the number of overweight parents was evident only among non-overweight participants (one overweight parent versus none: RR, 3.4; 95% CI, 0.8–14.4; two overweight parents versus none: RR, 6.4; 95% CI, 1.5–27.5; χ^2 test for trend, $P = 0.01$).

DISCUSSION

Our study highlights an important problem in health promotion: that general public awareness of a problem does not necessarily translate into concern on an individual level. Despite the high rate of overweight and obesity in the 4-year-olds in this study, only 5% of mothers expressed concern that their child was currently overweight. These findings are consistent with earlier studies in the US and UK showing equally low rates of concern for child overweight.[4,5] Many more mothers reported concern that their child would become overweight in the future. For children not currently overweight, this was related to the number of overweight parents in the family, suggesting that awareness of familial risk of obesity does have an impact on mothers' concern about potential weight problems in their children.

The increasing prevalence of child overweight may have "normalised" this condition and contributed to the inability of mothers to recognise when their own child is overweight. Stereotypes of overweight children portrayed in the media tend to be at the severe end of the spectrum and may also distort the lay perception of overweight. In fact, most overweight and obese young children in the community do not stand out from the crowd. Additionally, parents of pre-school-aged children often express anxiety about thinness and "picky eating", when this is developmentally normal.[16] Ironically, overweight children may appear better nourished and be perceived as "better eaters", hence causing their parents less concern.

Two other studies have found a relationship between maternal concern for a child's current weight status and the child's sex, with mothers of overweight daughters much more likely to perceive them as overweight than mothers of overweight sons.[6,7] While this may be related to sex differences in body composition,[17] it seems more likely to reflect social values. Mothers may be more sensitive to weight and body image issues for girls, while larger boys may be seen as having a physical advantage.

Limitations of our study were its sample size, which precluded multivariable analyses. As the respondents of the survey were

4 Bivariate associations between child and parent factors and maternal concern for child being overweight currently and in the future

	Current overweight			Future overweight		
Predictor	Proportion (%) concerned	Risk ratio (95% CI)	*P*	Proportion (%) concerned	Risk ratio (95% CI)	*P*
Child's sex						
Female	11/166 (7%)	2.6 (0.85–8.0)	0.10	30/166 (18%)	1.2 (0.8–2.0)	0.39
Male	4/158 (3%)			23/158 (15%)		
Maternal education level						
< Year 12	5/66 (8%)		0.50*	12/66 (18%)		0.34*
Year 12 only	5/120 (4%)	0.55 (0.2–1.8)†		24/120 (20%)	1.1 (0.6–2.1)†	
Tertiary or postgraduate	5/129 (4%)	0.51 (0.15–1.7)†		17/129 (13%)	0.7 (0.4–1.4)†	
No. of parents overweight or obese						
None	2/69 (3%)		0.40*	4/69 (6%)		0.005*
One	10/134 (8%)	2.6(0.6–11.4)‡		25/134 (19%)	3.2 (1.2–8.9)‡	
Two	2/63 (3%)	1.1 (0.2–7.5)‡		16/63 (25%)	4.4 (1.6–12.4)‡	

* χ^2 test for trend. † Risk ratio for comparison with "< Year 12".
‡ Risk ratio for comparison with "no parent overweight". ◆

mothers, the results cannot be generalised to fathers. The sample was homogeneous in nature (first-born children, mostly middle class), but the high response rates and consistency with samples from other countries strongly support our findings and their generalisability.

Health professionals can help improve recognition of childhood overweight. The charting of child BMI could be encouraged as a part of normal practice, not only to provide an objective measure of weight status, but also to reassure parents who are anxious about underweight, and to start discussion. However, there may be other important reasons that parents are reluctant to acknowledge concern for their overweight child. Other research has suggested that mothers of obese children believed that concern was not indicated if children were otherwise happy and healthy, that children would grow out of their "puppy fat", and that there was a fear of stigmatisation or blame.[18]

Additionally, according to our findings, many parents perceived their children as having comparatively healthy diets and being relatively active. Public health measures for all children in multiple settings are needed to "shift the curve" back to healthier levels of nutrition and activity, and may avoid problems associated with approaches that single out overweight children and their families.

Improved efforts to discern parents' concerns and needs, and factors that motivate or inhibit them from taking action, are imperative if we are to begin to address the obesity epidemic, whether in clinical or public health settings. Further qualitative studies in a variety of social settings are needed to fill these gaps.

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COMPETING INTERESTS

None identified.

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