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Parental correlates of young children’s dietary intakes: a review

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Introduction

Optimal nutrition during early childhood is vital not only for immediate health, but because food habits and preferences learned at this time are likely to impact on food intakes and subsequently health across the lifecourse.1 The diets of young children contribute to high rates of overweight and obesity seen in this age group.2, 3 Dietary habits including high intakes of energy and non-core foods (energy-dense, nutrient-poor foods), and low intakes of fruits and vegetables,4, 5 are likely to be important. In addition, evidence suggests that obesity in young children is leading to earlier development of other chronic health problems previously only seen in older individuals, such as orthopaedic, neurological, pulmonary, gastroenterological and endocrine disorders.6

Evidence suggests that eating behaviours adopted in early life may track through life-stages.7–9 For example, studies have shown tracking of dietary intake, dietary patterns and food preferences through childhood,8, 9 and one Finnish study involving over 1000 participants has shown tracking of dietary patterns over 21 years from childhood into adulthood.10 Health outcomes also appear to track. A recent review found that overweight and obese youth are at increased risk of overweight as adults, though the strength of this association varied between studies.11 Additionally, there is evidence that adults who were overweight as children may be at greater risk of conditions such as cardiovascular disease, irrespective of their adult weight status.6

Given the impact of children’s diet on health throughout life, and the potential malleability of children’s diets, it is important to understand those factors which influence child food preferences and intakes. While there are a variety of possible influences, parents are likely to play the most pivotal role in shaping dietary intakes of young children. Parents determine the types and amounts of foods offered, the settings in which these foods are provided, and the expectations or pressures placed on the child’s eating.12

A number of authors have examined parental correlates of older children’s diets4–13, 14 however, evidence regarding young children has not been specifically explored since Campbell and Crawford’s paper in 2001.15 Evidence suggests that parental modelling, use of feeding strategies, nutrition knowledge, self-efficacy for providing healthy foods and food availability are all likely to be important correlates. As young children have limited social and environmental exposures, the correlates of their dietary intakes may be expected to differ from those described in older children. The aim of this paper is to review the literature regarding parental correlates of the dietary intakes of young children, however, where little or no evidence was available for this age group, studies of older children have also been included. In so doing we seek to provide insights regarding areas which may also be important in early life, but have as yet not been well researched. Young children are defined as those zero to three years of age inclusive, however, given the limited number of studies conducted exclusively within this age group, studies involving any children within this age range will be included in this review. This paper will not consider breast-feeding.

Parental modelling

Parental modelling of eating encompasses both parents’ usual eating behaviours, and the opportunities children have to observe these, such as family meal times. Though no studies have assessed associations between family meals and diets of young children, both cross-sectional and longitudinal studies of older children suggest that more frequent family meals may be associated with healthier child diets, particularly greater intakes of fruits and vegetables and lower intakes of soft drinks.16, 17

Parental modelling via their own diet is the most frequently reported correlate of young children’s diets.16-23 Reviews of studies including older children (aged four to 18 years) have also highlighted consistent associations between diets of parents and children,4, 16 and additionally there is evidence of associations between food preferences of parents and their children.7

Of seven relevant papers investigating associations between diets of young children and their mothers, six report direct associations,16–23 and one found no significant association.24 The study reporting no association was conducted within a small, low income population of 100 mothers and toddlers in the United States (US).24 It is possible that the small sample size and relative homogeneity of the sample may have limited the capacity to detect significant associations.

One study which showed a direct association between diets of young children and their parents reported on a sample of 316 children aged two to seven years.24 In that study, mothers’ consumption of fruits, vegetables, sweets and soft-drinks were found to be significant correlates of child consumption of the...
same foods. Maternal fruit consumption was also significantly inversely associated with child soft-drink intake, and directly associated with child intake of vegetables. These findings have been further corroborated by a study of 564 children aged two to six years in London nursery schools.\(^{15,23}\) That study assessed frequency of fruit and vegetable consumption and reported that maternal intakes of fruits and vegetables were the strongest correlates of child intakes of these foods.\(^{16,17}\) Furthermore, a study of beverage intakes of 93 mothers and their two and three year old children showed significant direct associations between maternal and child intakes of soft-drinks (at both ages), ‘sweetened drinks’ (at two years), juice (at two years) and water (at two years).\(^{20}\) Finally, two longitudinal studies which assessed maternal diet during pregnancy also showed direct associations between both healthy\(^{22}\) and unhealthy\(^{23}\) aspects of mothers’ diets and similar intakes of their children at 12 months of age.

Overwhelmingly data suggests that parental modelling is likely to be an important correlate of young children’s diets, with six of seven papers reporting significant associations between diets of young children and mothers, consistent with studies in older children. Family meal times as opportunities for modelling are also likely to be important, as suggested by studies of older children. Given the clearly demonstrated importance of parental modelling as a correlate of child diet, improvement of this parental domain is likely to be important in intervention trials.

**Parental feeding strategies**

The ways in which parents engage with their children around food and feeding are likely to impact on a child’s food intake. Parental feeding strategies refer to methods used by parents to influence a child’s dietary intake, such as use of foods as rewards, or pressuring children to finish their meals. There is evidence in young children that feeding strategies such as promoting child control of their food intake may support healthier child dietary intakes.\(^{25,26}\) However, other practices, including parental use of foods as rewards, pressure, and some types of food restriction may promote unhealthy dietary habits.\(^{15,23,25,26}\)

One example of a feeding strategy which may have negative impacts on children’s dietary intakes is the use of food as a reward.\(^{15,16}\) In experimental studies with young children, child preference has been shown to increase for foods used as rewards, while foods used as the ‘means’ to obtain rewards decreased in preference.\(^{23}\) Cross-sectional studies have also shown associations between use of food as a reward and less healthy diets of young children. For example, a recent study including 219 children aged three to six years reported an inverse association between parental use of food as a reward and child intake of fruits and vegetables.\(^{25}\) Furthermore, a direct association was observed between parental use of food as a reward and child intakes of sweets in two to seven year old children (n = 316).\(^{16}\) Together these findings suggest that parental use of foods as rewards may indeed promote less healthy child dietary intakes. In contrast, one study of 351 preschool children found no association between parental use of food as a reward and child diets.\(^{15}\) However, the use of different dietary methodologies in that study may explain those inconsistent findings. In addition to associations with childhood food preferences and intakes, use of food as a reward or punishment in childhood may be related to poorer eating habits in adulthood.\(^{23}\)

The use by parents of pressure and/or restriction in their feeding practices is also considered likely to impact on children’s dietary intakes. Parental pressure in feeding generally refers to urging children to eat more,\(^{17}\) while restriction refers to limiting access to particular food choices.\(^{21}\) Parental use of a combination of these strategies has been referred to as a ‘controlling feeding style’.\(^{22}\) In a United Kingdom (UK) study of 564 children aged two to six years, greater parental control was associated with less frequent child intake of fruit and vegetables.\(^{23}\) Conversely, use of lower parental control, and allowing greater child control over what foods are eaten and how much they eat may have the opposite effect. For example, a study of 219 mothers of three to six year olds found that allowing a child greater control over their own intake was directly associated with increased child consumption of fruits and vegetables.\(^{25}\) Furthermore, in a study of 231 caregivers of three to five year old children, use of an authoritative feeding style (encouraging children to eat healthy foods, but also allowing children some control), was directly associated with increased child intakes of vegetables and dairy.\(^{26}\) Additionally in that study, a highly controlling parental feeding style was inversely associated with child vegetable intake.

Two recent reviews have reported on a growing literature linking parental feeding strategies with child overweight, obesity and weight gain, in children of all ages\(^{20}\) and children one to 12 years of age.\(^{17}\) Those reviews highlighted restriction of child eating (i.e. limiting access to particular food choices) as an important factor associated with higher child weight. While this does not provide evidence of an association with child diet, the link between weight and diet suggests that an association between unhealthy child dietary intakes and restriction may also exist. However, more recent evidence in both young and older children suggests this relationship may be more complicated.\(^{15,23}\) For example, a study of children followed from birth found that restrictive feeding was associated with lower child weight at two years.\(^{23}\) It may therefore be that the type of restriction used and measured is important.\(^{20}\) Ogden et al have discussed restriction as ‘overt’ or ‘covert’, whereby children are aware or unaware of the food restriction taking place.\(^{23}\) Those authors suggest that the type of restriction used by parents may in fact influence the impact of restriction on children’s consumption and body weight.

**Parental nutrition knowledge**

Nutrition knowledge influences an individual’s food choices and dietary intake.\(^{14}\) Though knowledge does not necessarily predict behaviour, inadequate understanding of nutrition may limit capacity for behaviour change and dietary improvement.\(^{14}\) Data considering relations between adults’ nutrition knowledge and dietary intakes suggests a direct association.\(^{16}\) Given that parents are the main providers of children’s food, and that parental dietary intake is correlated with young children’s diets, parental nutrition knowledge may in turn impact on children’s diets. For parents, knowledge of age-appropriate nutrition recommendations and appropriate feeding strategies for their children are postulated to be important.\(^{10}\) One study of older children has shown a direct association between maternal nutrition knowledge and fruit consumption.\(^{20}\)
Two cross-sectional studies have considered the association between parental nutrition knowledge and the dietary intakes of their young children. Variyam et al., in a study of 458 preschool children aged two to five years, found higher maternal nutrition knowledge was directly associated with lower child intakes of total fat, saturated fat, cholesterol and sodium, and higher child intakes of fibre. Conversely, an analysis of data from 447 preschoolers revealed that parental nutrition knowledge was not associated with the fruit and vegetable intakes of their children. The difference in results may have been due to different child dietary outcomes reported, and/or use of different tools to assess parental nutrition knowledge.

Nutrition knowledge of parents of preschoolers has also been described in qualitative studies. For example, a focus group study conducted with 25 parents in the US found that many parents were not confident that their children could self-regulate their intakes, and most gave examples of overfeeding their children. About half of the parents in that study did not think overweight in young children was a ‘real problem’, and many did not identify any connection between obesity in preschool children and potential health problems. Furthermore, an Australian study with 505 mothers of nine-month-old children showed that many did not understand the nutritional basis of child feeding guidelines, highlighting a potential lack of child-specific nutrition knowledge.

Parental self-efficacy for providing healthy foods
Parental self-efficacy for providing healthy foods refers to parents’ belief and confidence that they can undertake the necessary actions to provide their child with a healthy diet. Parental self-efficacy has been infrequently studied in relation to child dietary intakes, but is known to be an important influence on other aspects of child rearing. Increased self-efficacy has also been identified as a correlate of healthy eating in adults.

One cross-sectional study has reported on parental self-efficacy and associations with diets of young children. That study included 60 mothers with children aged six to 20 months and found that maternal self-efficacy for promoting healthy eating was directly associated with the amount of vegetables their young children ate. Additionally, maternal self-efficacy for limiting non-core foods and drinks was inversely associated with child intakes of cordial and cake.

Further, two qualitative studies have reported parent identified barriers related to child feeding and child dietary intakes. Discussion of these studies is relevant given that self-efficacy and perceived barriers are likely to be related, (i.e. self-efficacy decreases when perceived barriers are high). In one study of 39 parents of Canadian preschoolers, reported barriers to providing children with a healthy diet included particular child food preferences and demands, lack of time to prepare foods and eat together, partners/other parents having different rules/expectations, and grandparents or other carers providing unhealthy foods. Similar barriers were identified in another qualitative study involving 29 low-income parents of three to five year olds in the US, where more than half of parents’ comments regarding offering foods were related to barriers.

Studies, parents described ‘giving in’ to child demands in order to avoid conflict around food. Low parental self-efficacy and limited appropriate strategies to deal with perceived barriers resulted in parents providing unhealthy foods to avoid conflicts. Parents who report multiple perceived barriers to supporting healthy child dietary intakes may have low self-efficacy for this behaviour, which may in turn contribute to less healthy child dietary intakes. Self-efficacy may be an important consideration for behaviour change, and therefore relevant when designing interventions to support the development of healthy eating patterns in children.

Food availability
Children cannot learn to prefer foods to which they are not exposed, and parents of young children are usually responsible for children’s food exposures. Reviews of studies including older children aged four to 12 years have found home availability and accessibility of fruits and vegetables to be associated with child intakes of those foods, and that availability at home may be more important than in other locations. There have been fewer studies regarding non-core foods, but those available also suggest associations between home availability and older child intake of foods such as soft-drinks and unhealthy snacks.

One study of young children has reported on parent purchasing as a measure of food availability in the home. That study found those parents who purchased more fruits and vegetables, thereby increasing child exposure to those foods, had children who were more willing to try fruits and vegetables in a taste-test. A further study of 280 older children only slightly older (aged four to five) found that home availability of fruits and vegetables, sweetened beverages and non-core foods was directly associated with child intakes of each of those food groups. Together these studies demonstrate the likely importance of food availability in influencing the diets of young children.

Limitations of existing research
Research regarding influences on the diets of young children is increasing, but there remain some major gaps in current knowledge. Firstly, nearly all the studies discussed here report only or predominantly on mothers, even though paternal influence is also likely to play a vital role. Secondly, few studies have reported exclusively on young children, with most studies reporting on a wider age range than zero to three years. As discussed earlier, the sphere of influences in this age group is likely to be smaller than for older children, and it may be that the strength of associations between parental variables and child diets is increased when young children are considered separately. Finally, cross-sectional studies do not account for the possibility of child influence on parental domains. This is particularly important in relation to parental use of feeding strategies, which are likely to be influenced by child weight and temperament.
Conclusion

In summary, evidence suggests that a number of potentially modifiable parent behaviours are likely to influence young children’s dietary intakes, particularly maternal diet and certain feeding strategies. While there are few studies in this age group regarding parental nutrition knowledge, parental self-efficacy for providing healthy foods and food availability, their potential importance is highlighted by studies of older children and adults. Recent evidence showing unhealthy dietary intakes and increasing health problems in young children highlights the importance of research in this area. Further studies will be important to more thoroughly investigate parental correlates of young children’s diets, and to explore directionality of influences. Ultimately it is important to conduct intervention trials to assess whether these identified, potentially modifiable parental correlates can be improved, and whether such improvements result in improved child dietary intakes.

Acknowledgements

Alison Spence is supported by a Deakin University Postgraduate Research Scholarship. Karen Campbell is supported by a Victorian Health Promotion Foundation Public Health Fellowship. Kylie Hesket is supported by a National Heart Foundation of Australia Career Development Award.

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