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Etiology and Pathophysiology

Parental perceptions regarding healthy behaviours for preventing overweight and obesity in young children: a systematic review of qualitative studies

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Summary

Evidence is increasingly pointing towards the importance of early life strategies to prevent childhood overweight and obesity. This systematic review synthesizes qualitative research concerning parental perceptions regarding behaviours for preventing overweight and obesity in young children. During May and June 2008, a range of electronic databases were searched and together with lateral searching techniques 21 studies were identified for review. Data extraction and synthesis using thematic content analysis revealed six organizing and 32 finer level themes. These related to child factors, family dynamics, parenting, knowledge and beliefs, extra-familial influences and resources and environment. Themes were mapped to a socioecological model which illustrated how factors at individual, interpersonal, community, organizational and societal levels interact in complex ways to impact on parental perceptions about healthy behaviours for preventing child overweight. Although parents suggested several ideas to promote healthy child weight-related behaviours, many of their views concerned perceived barriers, some of which may be amenable to practical intervention. Furthermore, intergenerational influences on parental health beliefs and knowledge suggest that health promotion strategies may be more effective if directed at the wider family, rather than parents alone. Significantly, many parents believed strategies to promote healthy weight should start early in a child's life.

Keywords: Children, obesity prevention, parental perceptions, systematic review.

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Introduction

Childhood obesity is frequently portrayed as a serious and complex modern-day 'epidemic'. This has created considerable public health concern due to the association of obesity with the development of several chronic and life-threatening physical and psychological health problems (1–3). Indeed, the World Health Organisation (WHO) has stated that obesity is a public health problem as serious as the polluted drinking water and inadequate sewage treatment of the 18th and 19th centuries (4). They view the prevention of childhood obesity as a 'high priority' with parents being seen as influential in child weight-related behaviours (5).

While it has been identified that parental support of health promoting behaviours can impact positively on child overweight and obesity (6), research shows that parents may not recognize the detrimental health consequences of their children being overweight (7–10), and even when they do, may feel confused by the plethora of messages about strategies for addressing the problem (11). For example, although exclusive breastfeeding and delaying the introduction of solid food until 6 months of age are known to be protective against the development of overweight, this

advice is not followed by many parents (12). With the family being the primary social setting impacting on young children, there is scope from an early age for preventive strategies that focus on parental influence (13). Parental perceptions about healthy behaviours for preventing childhood overweight and obesity could thus be significant for informing how professionals and others can support families in effecting change (14).

Reilly *et al.* (15) describe eight early life risk factors correlating with the development of obesity. These are birth weight, parental obesity, sleep duration, television viewing, size in early life, weight gain in infancy, catch-up growth and early adiposity or body mass index (BMI) rebound. They suggest some of these risk factors may be suitable targets for preventive interventions. Their findings on size in early life and weight gain in infancy are further reinforced by Gardner *et al.*'s longitudinal study which found that the highest amount of weight gained before puberty occurs before the age of five and that weight at 5 years is predictive of weight at age nine (16). Their conclusion, 'the die seems to be largely cast by 5 years of age' (16), reinforces the importance of prevention strategies starting early in a child's life.

Previous systematic reviews regarding childhood obesity prevention have predominantly focused on school-aged children and have involved quantitative studies, in particular randomized controlled trials (RCT's) of interventions (6,17–19). In view of increasing concern about childhood overweight and obesity presenting in younger children (15,16), it was considered timely to focus on the views of parents and other main carers about health promoting behaviours for their children from birth.

Aims and objectives

The aim of this systematic review was to identify and synthesize qualitative research literature regarding parental perceptions about healthy behaviours to prevent overweight and obesity in young children. In addition, it aims to inform those working with parents or carers about perceived barriers and facilitators for obesity prevention. Furthermore, it was anticipated that gaps in knowledge which could indicate areas worthy of future research or service development might be identified. The review thus sought to answer two questions. First, what are parental perceptions about healthy behaviours to prevent overweight and obesity in young children and second, what are the perceived barriers and facilitators to these healthy behaviours?

Methods

Selection criteria

Qualitative studies are particularly suitable for exploring the attitudes, beliefs and ideas informing how an issue is perceived and can capture the lived experience of the respondents (20). It was, therefore, considered appropriate that studies from any established qualitative research tradition would be suitable for addressing the review questions. To be included, studies needed to explore parental or main carer perceptions about behaviours to prevent overweight and obesity in children, and/or barriers and facilitators to childhood overweight and obesity prevention, in any setting. Although it was not initially specified whether studies should be concerned with primary or secondary prevention, it emerged that relevant studies concerning the opinions of parents whose children might already be overweight or obese existed, thus the authors agreed that it was appropriate to include studies reporting both primary and secondary prevention. Studies where children had underlying medical conditions or eating disorders were excluded. Also studies relating to children over 12 years of age were excluded because the focus of the review was young children. Participants thus needed to be parents or main carers of children from birth to 12 years of age.

The search strategy

During May and June 2008, a comprehensive literature search was undertaken utilizing a range of electronic databases. The databases searched, search terms used and lateral searching measures are detailed in Table 1. One further study was identified as relevant but excluded (although is discussed later), as it was found after lateral searching ceased (21). No search restrictions were placed on language or country of origin. However, only English language studies were ultimately included. The searches initially yielded 15 241 references which were then imported into an EndNote bibliographic database and following a process of electronic and manual elimination of duplicates; this number was reduced to 8925 records. A tool for initial screening for relevance of studies, based on the selection criteria, was formulated and piloted.

The reviewed studies

All titles and abstracts were screened for inclusion by two authors (M. P. & F. B.) with any disagreements being resolved by discussion. Hard copies of studies identified as potentially relevant from database and lateral searching were obtained for further screening by M. P. & D. T. Individual study authors were contacted for clarification of missing data where necessary. The detailed process for selecting studies is listed in Fig. 1. Ultimately 21 studies were selected for inclusion, four of which were related as they used the same sample and methodology (Irwin *et al.* 2005, He *et al.* 2005, Tucker *et al.* 2006a, Tucker *et al.* 2006b). A summary of the characteristics of included studies is detailed in Table 2.

Table 1 Search terms and databases searched

Databases searched	
ASSIA (Applied Social Sciences Index and Abstracts)	Earliest to June 2008
ChildData	1989 to June 2008
CINAHL Plus (Cumulative Index to Nursing and Allied Health Literature)	1937 to June 2008
PsycINFO	1806 to May 2008
PubMed	1998 to May 2008
Scopus	1966 to June 2008
Web of Science	Earliest to May 2008

Search terms†

†*This phrase was modified to meet the search requirements of each database*

OR	AND OR	AND OR	AND OR
parent*	perception*	'genetic factors'	Weight
carer*	attitude*	'family trait'	'Weight?control'
caregiver	aware*	'breast?feed*' 'bottle?feed*'	Over?weight
mother*	feeling*	'formula?feed*'	'Body Weight'
maternal	understand*	'weaning?diet'	'Body Weight Change'
father*	concept*	'mixed?feed*'	Obes*
paternal	knowledge	diet*	'rapid weight gain'
guardian*	opinion*	'infant?nutrition'	
foster?parent*	observ*	'infant?food'	
single?parent*	recognition	'eating habit*'	
step?parent*	belief*	sedentary	
step?family	view*	exercis*	
grandparent*	perspective*	activity	
		television	
		'television view*'	
		'family meal*'	
		'sleep*'	
		'sleep duration'	
		'school?dinner*'	
		'school?meal*'	

*Truncation symbol used to search databases for word ending variants.

Quality assessment method

There is much debate surrounding quality assessment (QA) in qualitative research. According to Higgins and Green 'over one hundred tools and frameworks are available to aid the appraisal of qualitative research' (22). Despite this, there is little agreement about how valid a measure of quality these tools provide or even whether such a 'holy grail' should be pursued (23–26). Although QA for qualitative research is a contested area, it was felt that the use of a structured appraisal tool would stimulate discussion between authors and allow for exclusion of a study if the integrity of findings was questionable. A QA tool was thus developed and agreed by all authors. This was a modified version of the tool used in the qualitative aspect of a systematic review by Bunn *et al.* (27), based on Spencer *et al.*'s Quality Framework (28). The authors considered this framework was sufficiently comprehensive to assess a range of qualitative designs.

Data extraction and synthesis

In addition to the debate about the relevance of QA in qualitative research, the various methods for synthesizing qualitative research data such as meta-ethnography (29), meta-study, critical interpretive synthesis (30), meta-synthesis (31) and thematic analysis (32) have attracted much controversy with no consensus about the merits of any particular approach (33). In producing this synthesis, our aim was to develop interpretations and explanations which might provide new insights into parental perceptions about health promoting behaviours in relation to obesity prevention in young children.

All authors extracted demographic data and thematic content from the included studies using a pre-piloted data extraction tool. Extracted data were compared for consistency, thus facilitating inter-rater reliability (34). A process of thematic networking (35) informed by Boyatzis (32) and Attride-Stirling (35) was then used to identify initial

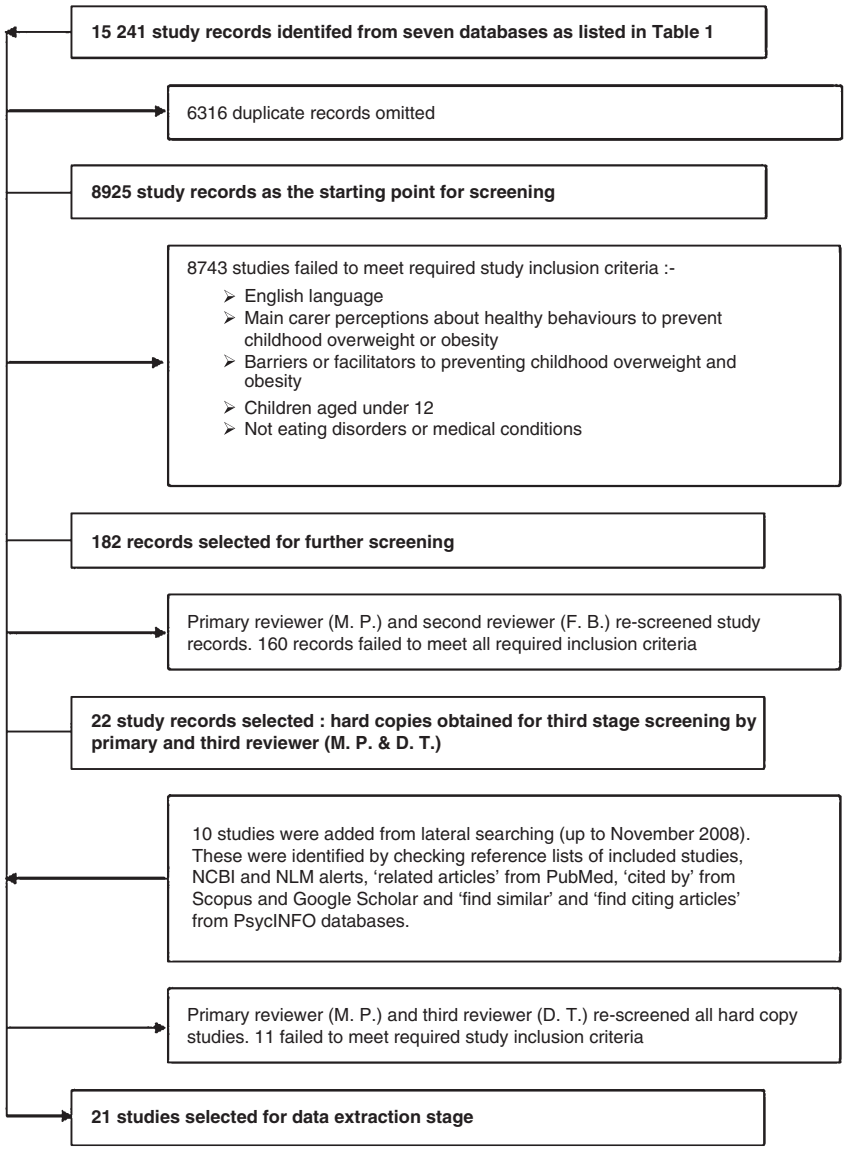

Figure 1 Flowchart for selecting studies.

categories to which themes could be ascribed. This was achieved by an iterative process of reading and re-reading the studies and themes extracted by the authors and inputting them into a Microsoft Excel computer programme to facilitate 'mapping' of themes. The authors then considered various options before reaching consensus on broad or organizing categories to which finer level themes could be allocated.

Results

Quality assessment

Overall, reporting of study methodologies was variable and frequently incomplete. The scope and purpose of studies was often inadequately described and even where study rationales had been stated, there was commonly no outline of theoretical or conceptual frameworks or frames of reference. Adequacy of sample sizes and issues surrounding generalizability and transferability generated most discussion between authors. It was considered sample sizes were adequate where appropriate for the intended purpose of sampling (36) and deemed acceptable if study authors had given sufficient information for typicality to be assessed, even if they had not stated limits of generalizability. Three of the studies failed to report ethical approval. However, ultimately no studies were excluded on grounds of serious flaws in quality.

The QA criteria used are listed in Table 3 and a summary of QA results is detailed in Table 4.

Table 2 Summary characteristics of included studies

Authors	Aim	Qualitative method	Participants, sample selection & socioeconomic (SE) factors	Setting
Bellows *et al.* (2008) (37)	Examined current physical activity practices, as well as attitudes, opinions, and desired wants and needs for physical activity materials	Focus groups ($n = 7$)	Mothers and fathers ($n = 45$) Non-clinical sample, selected purposively from diverse SE groups	Community (rural and urban Colorado) USA
Borra *et al.* (2003) (38)	Explored children's, parents' and teachers' attitudes, perceptions, and behaviours about preventing overweight in childhood and explored avenues for communicating overweight prevention messages	Focus groups (Phase 1) ($n = 16$)	(Phase 1): parents ($n = 112$) Non-clinical sample, selected purposively from diverse SE groups	Community (Chicago & Baltimore) USA
Campbell *et al.* (2007) (39)	Explored parents' views regarding factors that influence children's food choices and parents' decision-making regarding the food they provide to their children	In depth interviews ($n = 17$)	16 mothers, one father ($n = 17$) Non-clinical sample, selected purposively from diverse SE groups	Community (Victoria) Australia
Davis *et al.* (2008) (40)	Elicited the attitudes concerning pediatric obesity among rural parents, the barriers these parents face in trying to help their children attain a healthy weight status, and the pediatric weight loss services currently available in small rural communities	Focus groups ($n = 8$) via TeleMedicine	17 mothers and two fathers ($n = 19$) Volunteer sample, selected purposively to include parents of children with BMI over 85th percentile by parent report of child height and weight from parents from medium level SE groups	Community (rural Kansas) USA
Dwyer *et al.* (2008) (21)	Explored parents' experiences and challenges in supporting healthy eating and physical activity among their preschool children	Focus groups ($n = 5$)	Mothers and fathers ($n = 39$) Non-clinical, volunteer sample of parents from medium to high SE groups	Community Childcare Centre, (Hamilton) Canada
Gordon-Larsen *et al.* (2004) (41)	Explored perceptions of sedentary behaviours, barriers to and facilitators of physical activity, and directions for intervention factors in this high risk population	In depth interviews ($n = 51$)	Eight mothers and three grandmothers ($n = 11$) Non-clinical purposive sample of caregivers from medium SE groups	Community, (North Carolina) USA
Greves *et al.* (2007) (42)	Examined beliefs and barriers among immigrant families for walking to school and school breakfast participation in order to guide development of a school-based obesity prevention programme	Focus groups ($n = 6$)	Parents and grandparents ($n = 53$) Non-clinical purposive quota sample of parents from low SE group Vietnamese, Spanish and Somali parents	Community, (Seattle) USA
Hart *et al.* (2003) (43)	Assessed psychosocial constructs, and subsequent parental receptiveness to nutrition education, through investigation of the barriers and benefits perceived by parents to the provision of a healthy diet and adequate exercise for their children	Focus groups ($n = 7$)	40 mothers and one father ($n = 41$) Non-clinical purposive sample from range of SE groups	Community UK
He *et al.* (2005) (44)*	Explored parents' perceptions of their preschoolers' health-related behaviours	Focus groups ($n = 10$)*	Mothers, fathers and grandparents ($n = 71$)* Non-clinical volunteer sample from diverse SE groups	Community (Ontario, two of 10 sites rural) Canada*
Hesketh *et al.* (2005) (14)	Elicited the subjective views of primary school-aged children and parents in relation to: (i) perceptions, beliefs and attitudes towards social and physical environmental barriers to children's obesity prevention programmes and (ii) acceptable foci and modes of delivery of obesity prevention programmes for children	Focus groups ($n =$ not stated)	15 mothers and two fathers ($n = 17$) Non-clinical volunteer sample mainly from higher SE group, non-ethnically diverse parents	Community (Victoria) Australia
Irwin *et al.* (2005) (45)*	Examined parents' perspectives of their preschoolers' physical activity behaviours	Focus groups ($n = 10$)*	Mothers, fathers and grandparents ($n = 71$)* Non-clinical purposive volunteer sample from diverse SE groups	Community (Ontario, two of 10 sites rural) Canada*

Table 2 *Continued*

Authors	Aim	Qualitative method	Participants, sample selection & socioeconomic (SE) factors	Setting
Jain *et al.* (2001) (46)	Explored mothers' perceptions about how they determine when a child is overweight, why they become overweight and what barriers exist to preventing or managing childhood obesity	Focus groups ($n = 3$)	Mothers ($n = 18$) Purposive clinical sample (Children at or equal to 90th percentile for weight. Mothers had received some counselling re child weight management). Low SE groups. Mixed black and non-Hispanic white mothers	Hospital (Ohio) USA
Lindsay *et al.* (2009) (47)	(i) Described mothers' child feeding practices and perceptions of how these factors might be associated with child weight status, including underweight and the development of childhood overweight, (ii) Explored the role of socioeconomic, cultural and organizational factors on these relationships, (iii) Identified potential barriers that mothers in this population face to making healthy feeding choices for their children.	Focus groups ($n = 4$)	Mothers ($n = 41$) Purposive, non-clinical sample. Primarily low SE group participants	Community (rural, urban, coastal & indigenous) North East Brazil
Omar *et al.* (2001) (48)	Assessed nutritional needs and barriers in establishing healthy eating habits in toddlers	Focus groups ($n = 3$)	Mothers ($n = 6$) Fathers (n = 11) Other carers ($n = 3$) Purposive, non-clinical sample. White, Hispanic and African–American low-income participants	Community (Rural Michigan) USA
Pagnini *et al.* (2007) (49)	Investigated the perceptions of parents of young children aged 2–5 years regarding childhood overweight and obesity	Focus groups ($n = 7$)	Mothers ($n = 32$) Non-clinical volunteer sample of mixed SE group participants	Community (rural and urban) New South Wales, Australia
Pettigrew & Roberts (2007) (50)	Explored the factors that mothers feel diminish their control over their children's diets to provide insight into why obesity is a growing problem in countries such as Australia despite the ready availability of low-energy nutritious foods and the good intentions of parents	In depth interviews ($n = 12$) Focus groups ($n = 2$)	Mothers: some single, some two parent families ($n = 20$) Purposive non-clinical sample of medium SE group participants	Community Australia
Sherry *et al.* (2004) (51)	Engaged mothers of pre-school children from culturally and economically different backgrounds in focus group discussions to explore maternal attitudes, concerns, and practices related to child feeding and to examine maternal perceptions and concerns regarding child weight	Focus groups ($n = 12$)	Mothers ($n = 101$) Purposive non-clinical sample. Diverse cultural and SE groups	Community (Georgia) and University (Pennsylvania), USA
Styles *et al.* (2007) (52)	Identified culturally specific child management concerns and behavioural intervention needs of parents and other family caregivers, and their preferences for intervention channels and modalities	Focus groups ($n = 8$)	Mothers, fathers and grandmothers (n = 54) Purposive clinical sample. caregivers from mixed cultural and low SE groups	Community (Eastern & Central North Carolina) USA
Tucker *et al.* (2006a) (53)*	Explored parents opinions, perceptions and insights about preschoolers' dietary intake in order to understand the role of food in preventing childhood obesity	Focus groups ($n = 10$)*	Mothers, fathers and grandparents ($n = 71$)* Non-clinical purposive volunteer sample from diverse SE groups	Community (Ontario, two of 10 sites rural) Canada*
Tucker *et al.* (2006b) (54)*	Examined parents' perspectives in relation to physical activity programming and decreased screen viewing, regarding effective tools and programmes to target obesity	Focus groups ($n = 10$)*	Mothers, fathers and grandparents ($n = 71$)* Non-clinical purposive volunteer sample from diverse SE groups	Community (Ontario, two of 10 sites rural) Canada*
Zehle *et al.* (2007) (12)	Elicited women's attitudes and knowledge regarding childhood nutrition and physical activity	In depth interviews ($n = 16$)	Mothers ($n = 16$) Non-clinical purposive sample from diverse SE groups	Home (Sydney) Australia

*These studies used the same study population.

Table 3 Quality assessment criteria

Criteria	Examples
Scope/purpose	Explicitly stated aims/objectives of research Adequate description of research context
Design	Appropriate use of qualitative methods
Sample	Adequate description of sample used, sample identification and recruitment. Appropriate sample size for study objectives. Selection criteria explicit. Inclusions/exclusions explained.
Data collection	Adequate description of data collection methods.
Analysis	Adequate description of methods used to analyse data.
Reliability/validity	Clarity regarding how evidence and conclusions derived. Evidence of assessment of validity.
Generalizability/ transferability	Clarity about extent to which evidence can be generalized beyond settings and study participants.
Credibility/integrity/ plausibility	Evidence is credible and gives meaningful illumination of lives/contexts being researched.
Ethics approval	Evidence of ethical approval by an appropriate body.

Quality assessment criteria informed by Spencer L *et al.* (28), *Quality in Qualitative Evaluation: A framework for Assessing Research Evidence* (London: Government Chief Social Researcher's Office, 2003) and Bunn F *et al.* (27), A systematic review of older peoples' perceptions of facilitators and barriers to participation in falls-prevention interventions, *Ageing Soc* 2008; 28: 449–472.

Key findings

One study was conducted in the participants' own home and one was hospital-based but all the rest were conducted in community settings. Nine studies were based in the United States of America, five in Australia, five in Canada, one in South America and one in the United Kingdom. The participants included mothers, fathers and some grandparents, with the majority of participants being mothers, which reflects the position of women as primary child-carers in most societies (Table 2). Study participants came from a range of socioeconomic (SE) backgrounds. Twenty-four per cent were from low income, 5% high-income and 71% mixed-income families. Sixty-two per cent of the children whose parents participated in the studies were less than 5 years old. Most studies used population samples which may or may not have included overweight or obese children. In the few that purposively sought overweight children, study authors did not state whether parents had specifically sought help regarding overweight prevention for their children.

All included studies utilized thematic analysis to report findings. The extraction of themes initially identified forty-two categories which encompassed all thematic content. Six broad organizing themes, encompassing 32 finer level themes emerged (Table 5). The organizing themes were considered as relating to child factors, family dynamics, parenting, knowledge and beliefs, extra familial influences and resources and environment. All study themes were represented within this process, including themes occurring infrequently, such as parental perceptions about gender variations relating to child weight management, which only occurred in one study. Some themes were more prominent than others. This can be seen from the frequency with which they occurred across studies (Table 5). The most common theme related to parental perception about lack of time, which acted as a barrier to child exercise and healthy diet. Some of the themes overlapped. For example, even where parents had knowledge about healthy eating and physical activity to prevent child overweight, media and marketing influences in the form of advertising and pressure from a child's peers acted as barriers to putting this knowledge into practice.

It became evident that the themes could be further mapped to a socioecological model (55) based on Bronfenbrenner's ecological systems theory (56) (Fig. 2). This framework is useful in illustrating how factors influencing health behaviours in relation to childhood overweight and obesity impact at individual, interpersonal, community, organizational and societal levels in a complex and interdependent way (57–59); the application of which is further discussed later.

Thematic findings

Child factors

Parents cited various child-related factors impacting on behaviours associated with overweight and obesity. Preference for certain foods, children disliking new foods and being 'picky eaters' were considered barriers to healthy eating. Some parents relied on 'fast foods' because they were concerned that their children would eat nothing else.

Children's preference for sedentary activities was seen as a barrier to physical activity. Some parents commented that it was difficult getting children active where they were resistant. Parents sometimes felt that their children's behaviours were unlikely to change. Reconciling differing child preferences within a family was also seen as problematic, where one child liked physical activity and another preferred sedentary activities.

Some parents acknowledged that prolonged TV viewing might encourage sedentary behaviours and said they wanted ideas for alternative physical activities to occupy children at home. For others, TV was not seen as detrimental. For example, some parents believed TV to be educational and that it could encourage activity if children danced and jumped around to programmes. Some parents

Table 4 Summary quality assessment of included studies

Study	Scope/ purpose	Design	Sample	Data collection	Analysis	Reliability/ validity	Generalizability/ transferability	Credibility/ integrity/ plausibility	Ethics approval
Bellows *et al.* (2008) (37)	P	P	P	S	P	S	S	S	S
Borra *et al.* (2003) (38)	P	P	P	S	P	P	S	S	N
Campbell *et al.* (2007) (39)	P	S	S	S	S	S	P	S	S
Davis *et al.* (2008) (40)	P	S	S	S	S	P	P	S	S
Dwyer *et al.* (2008) (21)	S	P	S	S	S	P	S	S	S
Gordon-Larsen *et al.* (2004) (41)	S	S	S	S	S	P	P	P	?
Greves *et al.* (2007) (42)	S	P	?	S	P	?	P	P	S
Hart *et al.* (2003) (43)	P	P	P	S	S	S	P	S	S
He *et al.* (2005) (44)	P	P	P	S	S	S	?	S	S
Hesketh *et al.* (2005) (14)	S	P	P	P	P	P	P	P	S
Irwin *et al.* (2005) (45)	S	S	P	S	S	S	S	S	S
Jain *et al.* (2001) (46)	P	S	S	S	S	S	S	S	S
Lindsay *et al.* (2009) (47)	P	P	P	S	S	S	S	S	S
Omar *et al.* (2001) (48)	P	?	N	S	S	P	P	S	S
Pagnini *et al.* (2007) (49)	P	P	P	S	P	P	S	S	S
Pettigrew & Roberts (2007) (50)	P	S	S	P	S	P	?	S	N
Sherry *et al.* (2004) (51)	P	P	S	S	S	S	S	S	N
Styles *et al.* (2007) (52)	P	P	P	P	P	P	P	P	S
Tucker *et al.* (2006a) (53)	S	S	P	S	S	S	?	S	S
Tucker *et al.* (2006b) (54)	S	S	P	S	S	S	S	S	S
Zehle *et al.* (2007) (12)	P	P	S	S	S	S	P	S	S

P, partly; N, not at all; S, fully or mostly satisfied; ?, not clear.

were unaware of the quantity of TV watched by their children and seemed more concerned about the suitability of programme content. TV viewing was also seen as a useful babysitting tool and as positive family bonding time. Where the TV was constantly on as 'background noise', parents commented that children were less likely to engage in physical activities and were exposed to advertising for 'fast foods'.

In several studies parents expressed concern about the effects of overweight on their child's self-esteem because of being teased. Some parents were reluctant to address overweight for fear of adversely affecting their child's self-esteem or inducing an eating disorder.

A child's special needs because of illness or disability were thought by a few parents to influence their child's capacity to participate in physical activity. Also where a child's condition necessitated frequent visits to doctors and therapists, parents felt that they had little time or energy for focusing on the child's diet.

Family dynamics

The broad theme of family dynamics highlighted many barriers to behaviours for preventing child overweight and obesity. Parents in several studies recognized that their own behaviour potentially influenced their children's and expressed the belief that it was important for parents to act as positive role models, both in relation to diet and exercise. Eating and exercising together was cited by some parents as a positive influence on weight-related behaviours, but this often did not happen because of a perceived lack of time. Parents sometimes thought, however, that it was sufficient to encourage their children to be active, without being active themselves.

Being a good role model was difficult for parents when other adult family members undermined them. In this respect, conflict between family members was a significant issue. Fathers and others were criticized by mothers for sabotaging their efforts at providing a healthy diet, or for watching TV too often. Mothers said that they preferred to avoid conflict, however, because they feared that it might upset child/adult relationships. Also, some mothers were reluctant to upset their children over food because they perceived this would make them unhappy, or they simply wanted a quiet life and constantly having to monitor a child's diet was seen as too stressful. Food was commonly used and widely sanctioned by parents as a reward for desired behaviour. Some parents thought using food as a bribe was acceptable if they perceived it to be a 'healthy' food. Using food to manipulate a child's behaviour was a practice that appeared common to all cultures and SE groups.

There were differences of opinion within families about how a child's diet, exercise and TV viewing behaviour should be managed. Where family members readily gave children 'fast food' or sweets, mothers reported feeling like spoilsports if they were restrictive. Grandparents, in

Table 5 Themes

Organizing themes					
Child factors	Family dynamics	Parenting	Knowledge & beliefs	Extra-familial influences	Resources & environment
Finer level themes *(figures in brackets) = frequency of theme across all 21 studies*					
Child's food & exercise preferences (8) *'She's picky. That's what we fight about all the time . . .'* (Dwyer *et al.*, p.340)	Parental role in modelling healthy diet & exercise behaviours (10) *'If you eat junk food all day, potato chips, cookies, pop, that's what they're going to do.'* (Jain *et al.*, p.1142)	Parental perceptions about lack of time for child exercise & healthy diet (14) *'I can't get my three year old and my four year old to skating, get home, have supper ready early in the evening and get them to bed . . . so I end up at McDonald's or Wendy's . . .'* (Tucker [a] *et al.*, p.69)	Parental knowledge & beliefs about diet, exercise & TV viewing (9) *'I don't think it's the TV or the computers or the Nintendo games (that cause obesity . . . But it's more what they are eating and how they are eating.'* (He *et al.*, p.122)	Media and marketing influences on child diet & exercise (7) *'Parents were aware that their family diet and activity levels were not as healthy as they would like . . . advertising and child peer pressure were the main barriers.'* (Hesketh *et al.*, p.22)	Affordability & accessibility of exercise facilities (12) *'Put it into an affordable price range that the average person could do.'* (Styles *et al.*, p.291)
Child's screen viewing behaviours (7) *'They are limited in what they can watch, but we don't limit how much they can watch.'* (Gordon-Larsen *et al.*, p.220)	Conflict & parental desire to avoid conflict (10) *'. . . my kids, it's like when we go to stores and they ask me for stuff . . . I just, I just want my kids to be happy so they won't bother me.'* (Styles *et al.*, p.283)	Parental control of child's diet & TV viewing (12) *'. . . They have to go and choose something else to do. I think that's the route we go with preschoolers, not making them active but making them do something else other than TV.'* (Tucker [b] *et al.*, p.254)	Recognizing child overweight as a problem (5) *'I think when they are small fat children are cute but not when they get bigger [older] . . .'* (Lindsay *et al.*, p.4)	Influence of child's peers on diet & TV viewing (6) *'I don't really want him watching that, but everybody else watches.'* (He *et al.*, p.123)	Exercise safety factors (10) *'The traffic is very bad . . . to be honest that's why I don't walk a lot.'* (Gordon-Larsen *et al.*, p.220)
Child self-esteem & parental fear of inducing eating disorders (5) *'You don't want to teach them not to like themselves like they are . . .'* (Davis *et al.*, p.2136) *'If I'm too hard on them, I worry that I could trigger an eating disorder.'* (Borra *et al.*, p.725)	Parental use of food to manipulate/control child's behaviour (6) *'If they're good I give them a sucker or something.'* (Jain *et al.*, p.1143)	Parental motivation to prepare healthy food & encourage child exercise (6) *'When I come home, I know I shouldn't turn on the television to baby-sit them . . . But it's a balance between my energy level and what I know I should do.'* (Dwyer *et al.*, p.343)	Parental beliefs regarding when healthy child diet & exercise habits should begin (5) *'It's what you get them used to when they're small.'* (Jain *et al.*, p.1142)	Societal role modelling (5) *'The mothers felt pressured to give their children treats, which they saw as part of current social norms: We feel like we have to give our kids things all the time . . . we have got to take them to McDonald's . . .'* (Pagnini *et al.*, p.808)	Affordability & accessibility of weight management programmes & support (8) *'An after school program occasionally for parents and children on nutrition education'd be wonderful.'* (Styles *et al.*, p.291)
Child health problems influencing diet & exercise (2) *'One parent stated that her son's speech problem made him frustrated when interacting with other children, making it difficult for him to participate in physical activity with others.'* (Dwyer *et al.*, p.342)	Family views influencing child diet, exercise & TV viewing (5) *'When I say she can't have it, her daddy gives it to her.'* (Jain *et al.*, p.1143)	Parental perceptions about responsibility for child weight management (4) *'The participants were unanimous that the early childhood care sector had a large and important role to play in promoting healthy eating and physical activity . . .'* (Pagnini *et al.*, p.809) *'. . . the role of the school was considered secondary to that of the family; the main responsibility for engendering healthy lifestyle was seen to lie with parents.'* (Hesketh *et al.*, p.24)	Parental perceptions of child's knowledge about diet & exercise (3) *'Parents thought that although their children knew about healthy food, they did not understand the consequences of eating unhealthy foods.'* (Hesketh *et al.*, p.22)	Quality of school meals (4) *'I think it's a shame that they don't have a few more healthy options on the canteen menu.'* (Pettigrew & Roberts *et al.*, p.308)	Affordability & accessibility of food (7) *'One of my big concerns is sometimes, like right now the vegetables and fruits are in season, yea[h], they're cheap . . . But once you get in the winter months the stuff that's cheap now goes skyrocketing in price and sometimes money's thin.'* (Omar *et al.*, p.98)
	Importance of eating & exercising together as a family (4) *'I think that it's very important, family group kind of things where you get exercise.'* (Gordon-Larson *et al.*, p.221)		Conflict between professional advice & lay opinions (3) *'. . . with our three-year-old now, we had a state nurse come into monitor her growth and her weight gain and all that. She was trying to tell us well you can't give the child a cereal bottle . . . Our family agreed, when a child wants it you give it to them . . . I find our family is better than the Health Department.'* (Omar *et al.*, p.100)	Influence of day care on child's diet & exercise behaviours (2) *'My kids started eating vegetables here. They wouldn't eat them at home.'* (Dwyer *et al.*, p.341)	Home/family based physical activities (7) *'We might walk to the store once or twice a week together.'* (Gordon-Larsen *et al.*, p.221)
	Impact of number & ages of children on diet, exercise & TV viewing (2) *'I find that since I've had my second, that he's watching more TV just because of the fact that I'm busy with the little ones . . .'* (He *et al.*, p.123)				Effect of weather on physical activity (6) *'Winter is so long here and they don't get the chance to go outside as much.'* (Bellows *et al.*, p.174)
	Parental perceptions about gender variations relating to child weight management (1) *'Within the high SES groups in particular . . . parents reported far greater concern regarding current or future weight problems amongst their female children than male.'* (Hart *et al.*, p.94)				

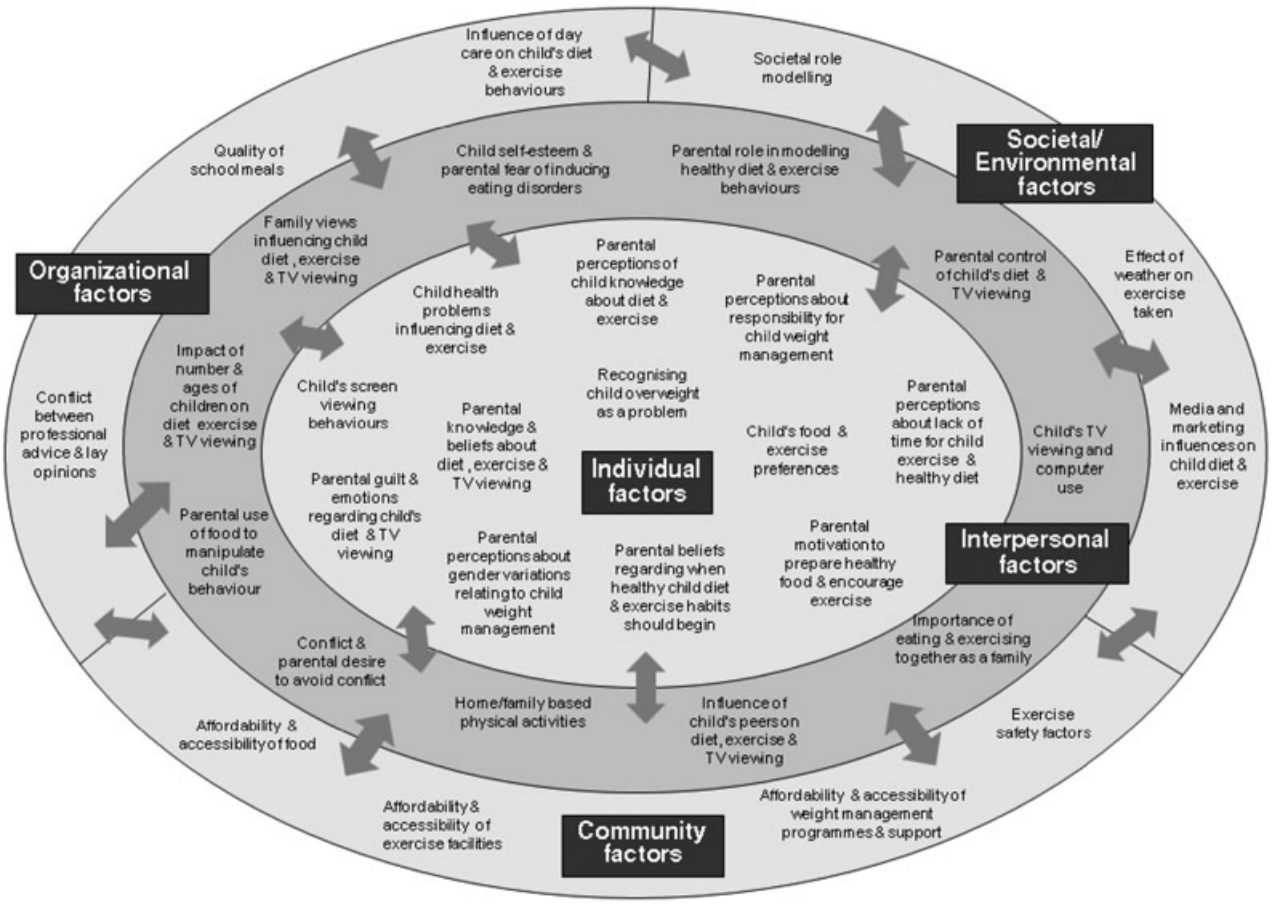

Figure 2 Socio-ecological model – thematic mapping.
Note: Socioecological model informed by Bronfenbrenner's ecological systems theory. Bronfenbrenner U (56), *The Ecology of Human Development: Experiments by Nature and Design* (Cambridge MA, Harvard University press, 1979).

particular, were reported to allow their grandchildren to eat whatever they wanted. Also when grandparents looked after children (often while their parents worked), this led to inconsistent handling of the child's dietary habits, causing difficulties later on for the parents.

Having children of differing weights within a family was problematic for some parents because they felt that they had to restrict the food intake of the larger child, which seemed unfair when other children in the family were allowed to eat more. Physical activities dependent on age grouping (such as swimming lessons) meant that siblings had to wait their turn. This could result in frustration for the child who was waiting and made it a stressful experience for both child and parent. Some parents recognized that they could not give attention to all their children at once and having multiple children meant that TV was commonly used as a 'babysitter' while parents were busy dealing with siblings. Although only a minor theme, there were variations in parental opinion about behaviours for preventing overweight, according to a child's gender. Some parents expressed greater concern about girls being overweight, along with the view that strenuous activities were less suitable for girls.

Parenting

This broad theme encompassed the concept of 'self-efficacy' (60) which related to parental beliefs about how far they felt able to influence their children's weight-related behaviours. Even when parents reported an awareness of health issues relating to diet and exercise, their actions did not always reflect this. For example, insufficient time to encourage child exercise and provide a healthy diet was the most commonly occurring theme in this respect. A lack of time was cited as a reason why parents did not encourage their children to walk to school or attend organized exercise programmes. Because many parents were concerned about the safety aspects of walking to school, both factors acted together as disincentives. Being busy with work inside and outside the home was seen by a number of parents as a barrier to preparing 'healthy' food. In addition, hectic family lifestyles meant more reliance on 'fast foods' to satisfy hungry children who were often perceived as unwill-

ing to wait for meals to be prepared. Many parents cited tiredness as a reason for their lack of motivation and commitment to encouraging their children to exercise and for not preparing 'healthy' meals. Tiredness was perceived to be due to the demands of paid work and childcare.

Various opinions about responsibility for child weight management were expressed, with some parents feeling that it was a family responsibility within their sphere of control and others that schools and other childcare providers were largely responsible, which took matters out of their hands. In this respect, the idea of overweight being inherited and beyond parental control was also cited. Some parents felt guilty about their children having a poor diet or watching TV. However, others saw TV viewing as educational and so there was little guilt or desire to restrict viewing because they felt that the child was benefitting.

Mothers were reported to feel a loss of control over their child's dietary habits when others, both within and outside the family sabotaged and undermined their decisions. Generally, parents seemed more concerned about children being under rather than overweight. This sometimes resulted in children being pressurized to eat more food, even when they said they were not hungry. Parents were more likely to exert control over TV viewing on grounds of programme content being unsuitable, rather than concern about sedentary behaviour. There was also a diversity of opinion about how much control parents should exert over their child's diet, with some parents having greater food rules than others. Some parents believed it important for children to have 'treat' foods.

Knowledge and beliefs

Parents in several studies believed that healthy habits should begin early to foster long-term healthy lifestyles. Being overweight was perceived as more of a problem for older children and some parents linked overweight with cosmetic appearance rather than health consequences. Overweight or obesity was largely seen as an issue for the future and a problem that would affect other people's children, rather than their own. In general, parents displayed a greater knowledge about the need for a 'healthy' diet to prevent overweight than about the need for an active lifestyle. Cultural and intergenerational opinions regarding child weight management were reported to inform parental knowledge and beliefs and often advice given by family members was trusted over that of professionals.

In terms of child knowledge about preventing overweight, some parents thought that children would benefit from more education about healthy eating and physical activity and believed that children did not understand the consequences of eating 'unhealthy' foods. This lack of child knowledge was seen by parents as a barrier to healthy behaviours.

Extra-familial influences

Various external influences were cited by parents as impacting on child overweight and obesity. Parents commonly perceived media and marketing influences as barriers to 'healthy' weight-related behaviours. It was thought that children were influenced from an early age, not only by TV advertising, but also food at supermarket checkouts. Gifts and advertising using popular children's characters all added to pressure on parents. Some parents felt that it was difficult to know which foods were 'healthy' due to persuasive marketing and they mistrusted information from the media, fast food manufacturers and government. It was suggested by some parents that popular children's characters might encourage healthier alternatives to 'fast food', and advertising could be used to frighten parents about the dangers of their children being overweight.

The influence of a child's peers on diet and TV viewing was seen both negatively and positively. Some parents thought that peer pressure, which started early in a child's life at playgroups and from friends, could be detrimental. This especially related to preferred foods and desire to watch popular children's TV programmes. However, other parents commented that peer pressure was positive because their children were more willing to try new foods.

Parents commented that wider society encouraged sedentary behaviours due to the ubiquitous nature of TV and video games, VCR/DVD players or satellite and cable TV. It was commented that schools should provide positive role models through educational messages, general policies and the school environment.

School meals and classroom food snacks were also seen as barriers to healthy weight-related behaviours. Mothers commented that schools undermined their efforts at providing a healthy diet. However, some parents commented that day care for young children had a positive effect on diet and on physical activity because children would try foods they refused at home and took part in physical activity because this was expected.

Resources and environment

Access to resources and general environmental factors was a theme that revealed barriers and facilitators for healthy weight-related behaviours, both in terms of physical access and the monetary resources needed.

Lack of local facilities was cited as a barrier to physical activity by many parents. In particular, parents thought that there were insufficient organized physical activities for toddlers and pre-schoolers. They identified a need for playgrounds and equipment, such as balls and slides and also larger facilities, such as cycle paths, swimming pools or activity centres within local schools. Local facilities were important because of difficulties associated with transporting children to distant venues. Some parents thought that minority groups should be specially catered for. Provision

of childcare to enable parents to access physical activities and be good role models was also suggested by some parents.

Parents expressed safety concerns relating to outdoor play equipment and facilities and also factors such as environmental pollutants, traffic, poor street lighting, roads considered unsafe for child cyclists and dangers to children from kidnappers, drug users, vagrants and strangers. This meant playing outside was often seen as a dangerous activity, meaning that parents had to spend time supervising their children. Although walking to school was generally thought a good idea, parents were often fearful for child safety. Some did, however, suggest ideas to improve safety such as crossing guards, safety patrols, more police, a 'walking school bus' and screening of parent volunteers for their suitability to work with children.

The cost of programmes and lack of transport was a significant barrier for some parents who thought that programmes would be most accessible if provided in local venues, such as schools. However, concern was expressed by some that organized programmes might stigmatize children who were already overweight. Parents suggested various ideas to make support accessible such as breakfast clubs to promote positive role modelling and home resources like 'fridge calendars for children to tick off activities'. Utilizing parents to help run family activity sessions was also suggested. Some parents felt that professionals blamed them for their child's weight problems and that more support was needed from community agencies and doctors.

Parents commonly perceived the cost of food was a barrier to a 'healthy' diet. Conversely, for some parents having money available meant that their child could have less healthy 'treat' foods, such as doughnuts. Some parents also commented that what their child ate was dependent on what was available. In terms of affordability, parents identified physical activities they could instigate from home. For example, walking or dancing to music was suggested to encourage preschoolers to be active as part of their everyday routine.

Poor weather was cited as a barrier to exercise by many parents and watching TV was often a preferred pastime during poor weather.

Limitations of the review

A number of potential limitations may have affected the validity of our results. Publication and other selection biases threaten the validity of all systematic reviews, and this is a particular problem when searching for non-randomized studies. Despite comprehensive efforts to identify all relevant studies, it is possible that some may have been missed. Because studies considered for inclusion were English language only, further data might have been revealed from including non-English language studies. QA remains contentious and we did not weight the included studies according to quality, which might be seen as limiting. However, we believe that the process of inter-reviewer QA agreement we adopted maximized robustness. Nevertheless, there is further scope for development of QA tools and application of QA assessment procedures to qualitative systematic reviews.

The studies included in this review were conducted in a variety of countries with a diversity of cultures and SE groups and the degree of their generalizability is uncertain. It is recognized that SE status could influence parental perceptions about behaviours for preventing overweight and obesity in children; however, no common SE themes emerged from the reviewed studies, thus no conclusions could be drawn in this regard. Nevertheless, this review provides an overview of parental perceptions about behaviours to prevent overweight and obesity in young children, which adds to the evidence base.

Summary and recommendations for future research and practice

This review aimed to identify and synthesize qualitative research literature regarding parental perceptions of healthy behaviours to prevent overweight and obesity in young children. Themes were extracted from 21 studies, grouped into 'organising' and 'finer level' themes and mapped to a socioecological model. This revealed that parental perceptions about healthy behaviours for child overweight prevention are influenced at many levels and often in complex ways. For example, a child's food and exercise preferences (individual factors) were seen to be influenced by parental and peer role modelling (interpersonal factors) and also by media and marketing (societal/environmental factors) and issues such as the influence of day care (organizational factors).

A secondary aim of this review was to inform those working with parents or carers about perceived barriers and facilitators for obesity prevention. The findings represented a range of parental views in this respect and although parents suggested ideas to promote healthy child weight-related behaviours, such as eating and exercising together as a family or using popular children's characters to advertise healthy foods, many of the views expressed related to perceived barriers. These are summarized in Table 6. The study by Dwyer *et al.* (21), which was excluded because it was identified after lateral searching had ceased, identified many of the same barriers and facilitators, such as time and financial constraints, parental and peer role modelling, access and safety issues and TV being used as a 'babysitter'.

It was further anticipated this review might identify gaps in knowledge which could indicate areas for future research

Table 6 Barriers and facilitators mapped to socioecological model

Barriers to healthy behaviours for preventing overweight and obesity in young children			Facilitators to healthy behaviours for preventing overweight and obesity in young children
Children disliking new foods (IF)	Children who are 'picky' eaters (IF)	Child preference for sedentary activities (IF)	Eating and exercising together as a family (IPF)
Children being pressurized to eat even if they say they are not hungry (IPF)	Children of differing weights in a family makes restricting food for some seem unfair (IPF)	Parents unaware how much TV the children are watching (IF)	Parents see themselves as having responsibility for preventing child overweight (IF)
Reconciling differing child preferences in a family (IPF)	Excessive TV viewing encourages sedentary behaviour and exposes children to advertising for 'fast foods' (IF)	Parents not acting as good role models in relation to diet, exercise & TV viewing (IPF)	Parental belief that developing healthy behaviours should begin early in a child's life (IF)
Parents disinclined to address overweight for fear of adverse effects on child self-esteem or development of eating disorders (IPF)	Illness or disability in the child affects ability to participate in active pastimes (IF)	Parents 'give in' to children for a quiet life (IPF)	Positive role modelling from child care outside the home, e.g. schools and day care centres (OF)
Parental wish to avoid conflict with relatives and child for fear of upsetting adult/child relationships (IPF)	Family members undermine and sabotage provision of healthy diet/restricting TV viewing – especially grandparents in relation to food and fathers in relation to TV viewing (IPF)	Difficult for parents to give attention to multiple siblings simultaneously, thus TV used as a 'babysitter' (IPF)	Use of popular children's characters to advertise healthy food (S/EF)
Food used as a reward to manipulate child's behaviour (IPF)	Organized activities dependent on 'age grouping' cause child and parent frustration when waiting their turn (OF)	Parental concerns about environmental safety, e.g. poor condition of playground equipment, dangers of walking to school from traffic or fears for children being abducted (CF)	Use of advertising to 'frighten' parents about consequences of poor child diet and sedentary lifestyle (S/EF)
Parental perceptions about gender specific 'norms' in relation to weight and activities (IF)	Insufficient parental time to encourage child exercise and provide healthy diet (IF)	Perception that overweight is only a problem for older children or other people's children (IF)	Provision of childcare to allow parents to access physical activities and be good role models (OF)
Parental tiredness leading to lack of motivation and commitment to healthy diet and physical activity (IF)	Parental reliance on 'fast foods' for fear that children will eat nothing else or be unwilling to wait for preparation of 'healthy' food (IF)	Intergenerational opinions about child weight norms and healthy diet requirements may conflict with parental wishes (IPF)	Improve condition of playgrounds and play equipment (CF)
Perception that overweight in children is a cosmetic rather than health issue (IF)	Lack of parental awareness about amount of TV viewed by children (IF)	Physical activity facilities not available locally, e.g. playgrounds, swimming pools (CF)	Provide more road crossing patrols to improve road safety (CF)
Cost of food and physical activities prohibitive (CF)	School meals and classroom food snacks (OF)	Weight management programmes inaccessible (CF)	Provision of adult 'walking bus' to facilitate children walking to school (CF)
Poor weather means less outdoor physical activity (S/EF)	Media and marketing influences on child diet (S/EF)	Insufficient organized physical activity for pre-schoolers (CF)	Use home based physical activities such as dancing to music (IPF)
Lack of parental recognition of child overweight (IF)	Parents unable to discern what constitutes healthy food, due to persuasive marketing (S/EF)	Parents see others, such as childcare providers, as responsible for preventing child overweight (IF)	Provision of breakfast clubs (CF)
Wider society encourages sedentary activity, through ubiquitous nature of TV/VCR's/DVD's (S/EF)		Lack of child knowledge about consequences of eating 'unhealthy' food (IF)	TV viewing to facilitate physical activity (IF)
			Utilize parents to help run family activity sessions (IF)

Socioecological model informed by Bronfenbrenner U (39), *The Ecology of Human Development: Experiments by Nature and Design*, Harvard University press: Cambridge MA, 1979. Key to socioecological model factors: IF, individual factors; IPF, interpersonal factors; CF, community factors; S/EF, social/environmental factors; OF, organizational factors.

or service development. In this respect, parents commented that they found advice from professionals often conflicting, or felt blamed if their children were overweight. This indicates that it may be worthwhile studying the attitudes of professionals who advise parents of young children, to better understand how they approach the subject of overweight and its prevention. For example, what preventive strategies do they promote? At what stage do health professionals recognize overweight in young children and how do they address this with parents? Furthermore, as the reviewed studies did not allow conclusions to be drawn about the effects of SE status on parental perceptions about behaviours to prevent overweight or obesity in childhood, this could be an area worthy of future research.

Some of the many barriers to overweight prevention identified by parents may be modifiable and amenable to practical intervention. For example, parents commented on the need for weight management programmes to be accessible. For some families this may mean offering support in the home. This could be provided by existing healthcare professionals or perhaps by trained volunteer peer supporters, who have already proved effective in promoting breastfeeding and other recommended feeding practices (61,62). An RCT of early intervention of multiple home visits to prevent childhood obesity using trained community nurses is currently in progress in Australia, the outcomes of which may be relevant and transferable to other settings (63).

The fact that many parental comments focused at the individual and family/interpersonal levels highlights the family environment and intergenerational influences as particularly significant regarding healthy weight-related behaviours. This is both in terms of role modelling and in the different knowledge, attitudes and beliefs various family members exert. This concurs with the findings of Hawkins *et al.* (64) and further reinforces the need to focus on the development of interventions early in a child's life centred on the family environment. The influence of wider family views thus needs acknowledgement when planning health promotion strategies, which may be more effective if directed at the whole family, rather than parents alone. It may be helpful for grandparents or other influential family members to be actively encouraged to attend information sessions on infant feeding, weaning and toddler diet alongside parents, preferably starting during the ante-natal period.

Few parents commented on breastfeeding as a strategy for childhood weight control although it is known that low breastfeeding rates are associated with higher levels of childhood obesity (65). This further underlines the importance of reaching parents and extended families during the ante-natal period. What is significant is that many parents expressed a belief that strategies to promote healthy weight-related behaviours should start early, which is where the challenge now lies.

Conflict of Interest Statement

There are no conflicts of interest.

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