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Choosing foods for infants: A qualitative study of the factors that influence mothers

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Choosing foods for infants

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Choosing foods for infants: A qualitative study of the factors that influence mothers

Abstract

Background

Examining the experiences of parents making food choices for infants is important because ultimately this influences what infants eat. Infancy is a critical period when food preferences and eating behaviour begin to develop, shaping dietary patterns, growth, and health outcomes. There is limited evidence regarding what or why foods are chosen for infants.

Objective

To describe the experiences of mothers making food choices for their infant children.

Methods

Semi-structured interviews with 32 Australian mothers of infants aged four to 15 months from a range of socioeconomic backgrounds. An inductive thematic analysis through a process of constant comparison was conducted on transcribed interviews.

Results

Mothers described many ideas and circumstances which influenced food choices they made for infants. Themes were developed which encapsulate how the wider environment and individual circumstances combine to result in the food choices made for infants. Beliefs, values, norms and knowledge were a central influence on choices. Cost, quality and availabilities of various foods were also key factors. Related to this, and combined with inherent factors such as perishability and infant acceptability, fresh fruits and vegetables were often singled out as an easy or difficult choice. Influences of time, parents' capacities, social connections, and different information sources were clearly apparent. Finally infants' own preferences and how parents helped infants with learning to eat were also key influences on food choices.

Conclusions

Choosing foods for infants is a complex social practice. An ecological framework depicting the multiple influences on what people eat and sociological theory on food choice regarding the role of 'social structure' and 'human agency', are both applicable to the process of choosing foods for infants. Equity issues may be key regarding the degree to which mothers can choose particular foods for infants (eg choosing foods which promote health).

Introduction

From 0-2 years of age (infancy) growth and development is rapid and includes dramatic changes in eating behaviour as infants transition from consuming solely breast milk or formula to primarily 'table' or 'family' foods (Birch and Doub 2014, Campbell *et al.* 2014). Foods chosen for infants during this time are of interest because it is a key period when early learning influences food preferences and eating behaviour, which consequently shapes dietary patterns, growth, and health outcomes (Birch and Doub 2014). Indeed, food choices made for infants are of importance because infancy may be a valuable time for establishing healthy eating habits towards subsequent prevention of chronic disease, overweight, obesity, dental decay and maintaining health over the life-course (Birch and Anzman 2010, Lynch and Smith 2005, Monasta *et al.* 2010, WHO 2003, Gussy *et al.* 2006, Anzman *et al.* 2010).

There is limited evidence regarding what or why particular foods are chosen for infants during this critical developmental period. Relatively little is known about what infants eat (Smithers *et al.* 2011). In Australia, infrequent national nutrition surveys measure diet in children aged 2 years or older only (Australian Bureau of Statistics 2014). In Australia, United States, United Kingdom, and the Netherlands existing limited evidence suggests some poor dietary choices are evident in early childhood (Lioret *et al.* 2013b, Siega-Riz *et al.* 2010, Robinson *et al.* 2007, Kiefte-De Jong *et al.* 2013). Very little is known about influences on choosing foods for infants, only a few population studies regarding the diets and influences on the diets during early life when food is introduced to infants have been conducted (May and Dietz 2010, Birch and Doub 2014, Lioret *et al.* 2013a, Lindsay *et al.* 2009, Kiefte-De Jong *et al.* 2013, Robinson *et al.* 2007).

There is evidence regarding the wide range of psychosocial and behavioural factors known to influence older (preschool and above) children's (Sleddens *et al.* 2015) and adult's

diets(Barker and Swift 2009). There is also evidence regarding these influences on infant diet, such as innate food preferences and parenting practices(Schwartz *et al.* 2011, Ventura and Worobey 2013). However studies regarding the influence of wider social and environmental conditions on choosing foods for infants are more limited(May and Dietz 2010).

The range of factors linked to parental attitudes and sociodemographic factors which are recognised to influence what infants eat include parental choices related to: breast or formula feeding; timing of introducing foods; foods of different nutrition value; and different weaning approaches(Cameron *et al.* 2012, Armstrong *et al.* 2014, Anzman *et al.* 2010, Robinson *et al.* 2007, Kiefte-De Jong *et al.* 2013, Bell *et al.* 2013, Lioret *et al.* 2013a). However this paper focuses on food choice decisions made by parents for infants, as it is of interest to also understand the role of influences beyond psychosocial, behavioural, and basic sociodemographic factors. In particular, put simply, this paper is interested to describe how the foods presented in an infant's environment end up there, as this ultimately influences what foods an infant eats.

An ecological perspective has been used in many disciplines 'to direct attention to both behaviour and its individual *and* environmental determinants(McLeroy *et al.* 1988, McLaren and Hawe 2005). Bronfenbrenner proposed the ecological systems theory to understand human development, and developed this concept to include socio- and bio- ecological understandings(McLaren and Hawe 2005). An ecological perspective on health takes into account factors at an individual level such as psychosocial behaviour right through to factors at a global level such as urbanisation, it emphasises contextual issues and interdependent relationships between all factors(McLaren and Hawe 2005).

This paper draws on an ecological framework which has been described for conceptualising the many food environments and conditions influencing what people eat (Story *et al.* 2008).

At the core of the model is the influence of individual factors encompassed by the social environment, by physical environments, and then by the all-encompassing influence of macro-level environments. It emphasises connections between people and their environment and views behaviour as affecting and being affected by these multiple levels of interacting influences (Story *et al.* 2008).

This research aims to explore the subjective experiences of mothers making food choices for infants, and seeks to examine the applicability of an ecological perspective for examining influences on food choices made by parents for infants.

Methods

This qualitative study was part of a larger prospective birth cohort study named (WITHELD). (WITHHELD) is following children from *in utero* to five years of age in regional cities, towns and rural areas in the (WITHELD) region, Australia. The aim and methods of (WITHELD) have previously been described and reported (WITHHELD).

Study Design

This study was designed to explore determinants of food choices for infants. It was informed by a social determinants of health perspective (World Health Organisation 2010).

Sample recruitment and size

Among all parent/children dyads participating in (WITHELD) (n=458), interview participants were purposively selected from those who indicated a willingness to participate in interviews (n=89). Consequently a sub-sample of 32 mothers were interviewed from a range of

socioeconomic backgrounds (mothers' education, income), family sizes (number of children), and (to address a separate study question) the type of water (tank, bottle, tap) usually consumed. As previously described these characteristics were selected as analytically important and have been shown to play an important role in infant and family health and diet (WITHHELD, Smithers *et al.* 2011). Eligibility for inclusion required that children taking part in the study were aged around six months or older at time of interview. Initial sampling continued until there was sufficient range of chosen demographic variables to address research questions and maximise potential richness of the data (DiCicco-Bloom and Crabtree 2006). The concept of saturation and consideration of available time and resources also guided the number of interviews performed (Mason 2010). Parents were invited to participate in interviews, only mothers accepted invitations. Pregnant women were recruited to the (WITHHELD) study, therefore mothers were the primary family contact. This may explain why only mothers accepted invitation for interview. That Australian mothers spend over twice as much time as fathers caring for children aged 0-5 years (Australian Bureau of Statistics 2006) may also explain this.

Interviews

Semi-structured interviews with mothers of infants (n=32) were conducted between March and June 2011. Participants were asked questions on three main topics: 'drink choice and water quality'; 'food choice'; and 'oral health'. Researchers developed and used an interview guide with 43 questions and prompts. The guide was informed by comprehensive review of literature to construct appropriate questions covering the three areas of research interest (DiCicco-Bloom and Crabtree 2006). Interview questions were piloted with four primary carers of infants aged six months to three years not involved in the (WITHHELD) study. Piloting was to help determine any flaws with interview design (Turner 2010). No

changes were made to the guide. Ten questions and associated prompts related specifically to this study on food choices (Table 1). Questions on drink choice were asked first, followed by food intake, and finally questions exploring attitudes and perceptions around oral health and healthy weight. There was minor variation to the order of questions and prompts used. Specific questions about breast or formula-feeding, or whether infants had “commenced solids/foods” were not asked unless self-disclosed. Two interviewers were present at all interviews. All were conducted in participants’ homes except two which were conducted in cafes and one in a relative’s home. Infants, siblings, partners, other family and a carer were variously present at interviews. The others were not interviewed, but sometimes volunteered comments. Interviews ranged from 25 to 60 minutes. Interviewers were trained in interview techniques and were known and introduced themselves as researchers. Interviewers’ interest in health was clear to participants through recruitment material and discussion at interview. Interviews were audio-recorded (with exception of one where audio-recording failed and additional field notes were made instead), transcribed verbatim, and coded.

Analytical strategy

Interview responses were discussed among interviewers and the research team throughout data collection and analysis (Green *et al.* 2007). Interviewing ceased when researchers agreed data saturation for the research topics was likely achieved (Mason 2010, Green *et al.* 2007). The three interviewers who were familiar and immersed in the data undertook analysis, one member of the research team (fourth author) also participated in initial coding (Green *et al.* 2007). Inductive thematic content analysis was performed with each transcript (Pope *et al.* 2000). The initial process of analysis for all the research topics explored in this study (‘drink choice and water quality’; ‘food choice’; and ‘oral health’) has previously been described and published (WITHHELD).

The final phase of analysis for the research topic explored in this paper (food choice) was undertaken by one researcher (first author). This phase commenced twelve months after the initial analysis previously described and published(WITHHELD). Transcripts were read and re-read. Codes and categories from questions on food were re-visited, further refined and themes generated from categories(Green *et al.* 2007, Pope *et al.* 2000). During this phase the researcher also became further sensitised to previous studies, theories and frameworks on food choice and infant nutrition. This informed the creation of a comprehensive explanation and interpretation of findings on food choices for infants presented here(Green *et al.* 2007, Pope *et al.* 2000). All interview participants were invited to comment on an initial summary of categories and themes. This was undertaken to strengthen credibility of results(Thomas and Magilvy 2011). No dissent was expressed.

NVivo 10(QSR International, 2013) software was used to store and organise data to assist with coding and analysis. The study was approved by Human Research Ethics Committees of (WITHHELD) and (WITHHELD). Interview participants provided written and verbal consent for participation, audio-recording and use of data. All participant information was de-identified and participants were assigned an identification number.

Results

Sample characteristics

Interviewee characteristics are given in Table 2. Key themes describing influences on choosing foods for infants were identified and are detailed below.

Beliefs, values, norms and knowledge

Personal beliefs, values and shared socio-cultural norms and values were key influences on choosing foods for infants. Food choices were often described as the result of juggling

different values, beliefs and ideas about food (such as on convenience, cost and health attributes) alongside personal or family circumstances. Health attributes of foods were also sometimes implied by contrast or by assumption.

With the baby, banana's easier to hand her but they're pretty expensive so ... but that's ok. I mean, I sort of figure that it's better than giving her a chocolate bar.(ID18)

Food choices were often discussed dichotomously using value labels such as 'good' or 'right' versus 'bad' or 'junk food'. Aiming for infants to have a 'balance' or 'balanced diet' was discussed. Mothers sometimes defined whether food choices met implicit socio-cultural norms. For example, when asked '*is there anything you think we should know about what's important when you feed your children*':

No I'm a bad bad mum (laugh)...I'm really laid back. It really doesn't stress me (laugh)(ID13)

Mothers' own childhood experiences with food and eating clearly shaped values and beliefs about health and food choice.

I just want them to eat everything that I didn't when I was younger. Pretty much...So I just want them to eat healthier foods.(ID15)

Specifically, the way parents were themselves parented and food choices that were made for them in childhood were described as influences on the food choices parents consequently made for their own infants. Wanting to improve poor, or alternatively continue good, approaches to food choice experienced in their own childhoods was mentioned. These parental beliefs, experiences and knowledge all impacted food choices made for infants.

Food: cost, quality & availability

Costs of different foods compared with other key values placed on foods, such as health benefits, or convenience, was important. Personal circumstances and beliefs also impacted whether a food or meal was considered cheap, affordable, or expensive. For example one mother described store bought ready-to-feed infant foods in this way:

It's just easier... And it's cheaper, (infant's name) doesn't really like, I've tried making it real and he just doesn't like it. ... All the others were brought up on that and they turned out all right.(ID13)

However another stated:

... it's cheaper to prepare fresh fruit and veg...(ID20)

Fresh fruits and vegetables were often singled out regarding cost and availability, related to inherent factors such as perishability and infant acceptability. Different experiences of accessibility to foods were reported, likely influenced by the wide range of participants' home locations. Access to fruit, vegetables, fish, and takeaway food was described as being influenced by whether and when families made a trip to town by participants in regional areas.

We're very lucky that my husband has got a really good job so money's not an issue when it comes to buying fresh fruits and vegetable and usually it's just availability in (name of small town) and whether I can get to (name of larger town) to get them. So I'm lucky enough to be in a position that cost doesn't affect me.(ID24)

The impact of low income on cost or affordability of different infant food choices was less clear. There was evidence that when faced with limited financial resources to buy food for

families in general, it could result in having to replace some preferred healthy food choices such as meat and vegetables with foods of possibly lower nutrient content and lower cost.

...probably half the time I have like pasta 'cause it's cheap ... and then I try to do meat and three vegies.(ID18)

There were comments about 'other parents' and how food cost could affect the quality of what they feed their infants or family.

I do it because I can ...I know there are a lot of people who can't. I mean we forgo a lot of other things because I buy better quality food if our financial situation was any worse than what it is, and it's not pretty at the moment, we would be living like a lot of people out there, who do feed their kids nothing but junk food. Because you know what? It's actually really cheap.(ID9)

Various qualities and attributes between home-prepared foods; takeaway foods; ready-to-feed baby foods from supermarkets; and fresh foods were contrasted. 'Knowing what goes into food' (including 'additives', 'preservatives', 'artificial colour', 'salt' and 'sugar') was commonly mentioned and contributed to whether different types of foods were valued or not. Nutrition value and also environmental concerns (such as packaging or genetic modification) were discussed at times.

A hierarchy of food quality for infants was often described or implied, which in this example included organic versions too.

... but before I got that (slow cooker), I did buy a lot more packed stuff definitely. Like baby especially ... I always bought the organic baby food and that, but I don't buy any now, not one.(ID16)

There were challenges with meeting hierarchies of food quality in different settings, such as outside the home.

Cost and the quality, like what you get ... and if we do go out like we will try to get yoghurt or a fruit salad or something. But once again you don't know how long it's been out for ...If we take a yoghurt in a little pot you know what it is but, (Partner comments: Chips we have sometimes). Yeah well if we need something quick.(ID12)

The availabilities of different foods in different settings combined with different social and cultural circumstances in different settings, could support or override parental intentions regarding food choices for infants.

We don't serve chips at home but he will... he loves chips if someone else has got them he's like a seagull. So ... unfortunately that's something when we do go out he somehow manages to get his hands on a few chips. But we feed him pretty much from the menu like an entrée, not from the kids menus 'cause the kids menus are pretty bad they are all fried ... so whether it's a risotto or like I said the prawns, he loves prawns, so whenever we get an entree of prawns he eats that.(ID29)

So he goes (to childcare) two days too, so he eats real vegies there.(ID13)

Time, capacity and resources

Time was clearly a valued and sometimes scarce resource. Preparation time required for different foods could be a key factor in foods chosen for infants. Making compromises on which foods were chosen was mentioned as a response to experiencing 'a lack of time'. Some

identified vegetables as challenging to provide in this regard, whereas some identified vegetables and fruit as more convenient.

Time that would be the only thing that would stop me from making her own food is time. If it's like ... in a can or a jar or whatever, it's usually because I haven't got time or if you're out somewhere, like if you come into town, I gave her a jar of food 'cause ... I didn't pre-pack some vegies like in a container.(ID29)

The challenges of time management impacting food choices could be detected in mothers' responses about needing to be organised to be able to make healthy food choices for themselves.

Alongside values, beliefs, and knowledge, the various abilities and capacities of parents impacted the food choices they made for infants. For example parents' skills and confidence with cooking, or their own self-efficacy could impact food choice variety; type; texture; and whether or which information resources were consulted.

If I'm not working then, you know may as well, just mash up what we're eating...It's a bit hard for my husband to, sort of, figure out the kids and cooking and all that sort of stuff 'cause he cooks while I'm at work, so...Mostly when I'm at ... home, that she'll (infant) have what we have.(ID15)

Parents' work and other commitments could impact the availability and use of time, economic resources, and childcare arrangements. These in turn could also impact food choices made for infants.

Social connections

Older siblings, extended family, grandparents, friends, and others could act as significant influences on foods chosen for infants. Means of influence included through provision of information, advice, opinions, role-modelling; and via foods others made available for infants to eat. This mother described her third child:

- *You know I've been more relaxed, like she's had ice cream already. I know she shouldn't of been having ice-cream, but her grandmother was feeding her, so I just let her go.(ID28)*

Food available in the house for family or older siblings influenced foods given to infants.

Food prepared for family or siblings and food for infants was often implied or referred to as the same thing.

The number of children parented was specifically described as an influence. Changes in knowledge, available time, experience, and parenting confidence with second or subsequent children, could lead to changes in infant feeding practices, approaches, and values.

Social connections were clearly both a direct influence and also an indirect influence through the way social connections ultimately shape personal and shared values, beliefs, norms, experience and knowledge. The influence of food-related values and beliefs held by significant others (in the following example at 'mums group') also became clear.

- *I had like frozen vegies for every meal and freezer ready, you know your first one you've got that luxury... .. you don't want to go to mums group, and yeah you know, and then after the first one you're like 'nah I don't care'.(ID28)*

Comparing food choices made by ‘other parents’ clearly shaped beliefs and ideas about what infants should eat. Mothers’ own food choices and concerns related to their own health also influenced food choices made for infants.

The influence of broader social and physical environments (such as siblings, kindergarten, schools) could combine with individual factors (such as infant preferences and parent attributes) to override or support parental intentions regarding food choices for infants.

I've laid her (older child) off all the crap. It's only 'cause she's started school . . . kinder was good, it was all fruit and all that, and when she started school ... everyone is bringing this and that and ... because of all the junk food it's hard when she has it, he (infant) wants it too, and it's like ... it is a little bit harder, but if I manage it would be better. And as I said, he (infant) doesn't eat much food.(ID6)

Information, including marketing & food labelling

Many sources of information or advice on infant feeding, food, and health are used. These were described variously as helpful; conflicting; unsolicited; actively sought out; numerous or scarce. Formats included electronic, paper, and verbal. Sources included government, commercial, and private such as family, friends, acquaintances, other mothers and health professionals. Mothers often distinguished between sources offering ‘opinion’ compared to ‘expert opinion’. Commonly mothers described making final decisions through being self-selective with any information:

...the health nurse put us on to that and what's the other one which I look at? ... I don't mind glancing though the forums, like (name of online baby forum) and things like that, but ... that's again can be a lot of opinion, like peoples' opinions rather than fact. And look even the facts, like I read one website and they tell you do this and you

read another factual and I suppose the factual website and still ... it's really just judging ... you know suck it and see a lot of the time, but, ... I try to just stick with couple of the main websites and see how I go.(ID25)

Preference for information and advice from sources which have practical experience with infants and children was also described. Difficulties obtaining adequate and easy to understand information, including healthy, quick meal ideas were mentioned by some. A need for good, quality, and trusted sources of information about food and health became apparent.

Food marketing could impact food choices made for older siblings (including through the use of licenced cartoon characters to promote food products) or for parents. The potential influence for infants of marketing claims on food labels could be seen.

I read on the packet that it was all soy, all natural ingredients. So I thought well, and it has salt in it but I thought well, just a little bit like a tablespoon is not going to make a difference. She just wants to be like everybody else.(ID32)

Infant preferences and learning to eat

Taste, flavour, (particularly sweet foods) and texture were all described as influences on foods infants preferred and consequently sometimes on the foods given to infants. Inter-relationships between what infants are given to eat and their preferences were apparent at times.

When you do start feeding them everything is, well they say fruit first, so it's all sweet stuff. So when you do try and give them meat, which is like 6 months onwards, they turn their nose up 'cause it's either too chewy or its more blander than fruit so... ...

The more pureed the better it's easier to swallow and they obviously like sweeter things than savoury.(ID23)

Aiming to offer 'different foods', 'variety' and wanting infants to experience enjoyment of foods and eating, in particular vegetables and fruits, were goals expressed by some. Perceived parental roles; expectations around what infants should eat; and goals and beliefs for overall health and development were influences on food choices.

...health and I guess the whole sense that as a parent you need to be creating... good eating habits with them. So it's a sense... well giving them the best chance... and I need to kind of show them the right way about eating and it is I believe it is, you know the home made stuff, the healthier stuff and the idea that they will hopefully develop a taste for that and continue with the good eating habits when they're adults.(ID3)

Mothers identified a process of infants accepting new tastes and textures through becoming familiar with repeated exposure over time. Managing the potential for infants to choke was mentioned regarding texture. Participants were specifically asked about strategies used if infants were uncooperative when offered food.

Usually we give him a taste and he's pretty good actually. He'll eat, he'll have a go at most things. If he consistently spits it we'll put it aside and try again in a week's time, because their taste, as you know, their taste changes on a week to week basis to do with their development of taste and their development.(ID24)

'Fussiness' was mentioned as a phase or as the nature of some infants. Foods infants 'dislike', 'hate' or 'won't eat' were reported and in some cases infants were offered alternative foods as a consequence. Other strategies were: providing several choices at a meal and limiting it to those; letting infants experience new foods including new textures without

expecting them to eat; positive reinforcement; and sometimes distracting infants or making a game to get food into their mouths.

Discussion

This study described the experiences of mothers making food choices for their infants. Ideas and circumstances which influenced food choices for infants were revealed. Themes were developed describing how food choices resulted from a culmination of influences in families' wider environments and their individual circumstances. Beliefs, values, norms and knowledge were central influences on choices. Cost, quality and availabilities of various foods were also key factors. Related to this, and combined with inherent factors such as perishability and infant acceptability, fresh fruits and vegetables were often singled out as an easy or difficult choice. Influences of time, parents' capacities, social connections, and different information sources were clearly apparent. Infants' own preferences and how parents' helped infants learn to eat were also key influences on food choices.

This study is amongst the first research to explore and describe multiple influences on choosing foods for infants. One other qualitative study of feeding practices in children aged 12 months to 3 years, but which focused on 'nutrition transition' issues in a developing country, similarly found social support networks were key influences, and also socioeconomic factors (Lindsay *et al.* 2009). Findings related to 'opinion', 'expert opinion', and the moralistic terminology assigned to foods were similar to findings from an earlier ethnographic study of family food in Australia (Coveney 1999).

As per an ecological perspective, identified influences cover individual, social and environmental factors as determinants of food choice (McLeroy *et al.* 1988, McLaren and

Hawe 2005, Story *et al.* 2008). Findings emphasize people and their environments are connected(Story *et al.* 2008) and behaviour (in this case food choice) is a manifestation of that connection.

Studies which have explored or demonstrated the applicability of food choice models and frameworks to understanding food choices made for infants are limited. Results presented here support the applicability of the ecological framework proposed by Story *et al.*(Story *et al.* 2008). Using this framework, influences on choosing foods for infants can also be categorised into the domains of '*individual factors (personal)*'(eg infant preferences); '*social environment (networks)*'(eg grandparents), '*physical environments (settings)*'(eg food available in cafés or childcare settings) and '*macro-level environments (sectors)*'(eg marketing or cultural norms and values)(Story *et al.* 2008).

Sociological understandings of food choice describe that 'the way we eat reflects an interplay between social structure and human agency'(Germov and Williams 2008). 'Social structure' refers to wider society and includes employment and education circumstances, food supply factors, governance and economic factors such as levels of poverty for example. 'Human agency' refers to the various potentials of individuals to exert choice and influence over their own lives and also over wider society(Germov and Williams 2008). Sociological theory emphasises 'structure and agency are inextricably linked'(Germov and Williams 2008), findings from the present study also demonstrate this. The usefulness of ecological approaches(Story *et al.* 2008) and sociological theory(Germov and Williams 2008) for understanding adult and child food choices has been extensively explored. The present study suggests that both ecological and sociological understandings can also explain how food choices are made for infants.

From a social determinants of health perspective, influences on food choices identified in this study are all fundamentally shaped by socio-political, socio-economic, socio-environmental and socio-cultural circumstances experienced by parents, families and communities (Friel 2009, World Health Organisation 2010). Consequently the degree to which parents are able to choose appropriate foods for infants (ie to choose foods which promote health for example) is also impacted by these social determinants. Health equity is concerned with the way systematic differences in society can unfairly impact health outcomes (World Health Organisation 2010). Previous studies have suggested the quality of young children's diets is socially stratified, and children of less advantaged backgrounds have poorer diets (Skafida 2013). However inequities in health are not contained to the poorest or most marginalised, rather health follows a 'social gradient' (Friel 2009). Therefore improvements in health or health behaviours requires actions which aim to improve the health of all but which will ultimately have proportionately more impact further down the social hierarchy (Friel 2009). Findings of the present study also support the notion that differences in infant food choices or health status, may be meaningfully explained by applying an equity lens (O'Neill *et al.* 2014) and examining differences in the conditions within families and the communities in which they live. Findings therefore suggest that promoting health through diet in infancy will require addressing: (1) inequities in socio-ecological environment conditions (including values, resources, social networks) (2) the socio-political, socio-economic, socio-environmental and socio-cultural circumstances which shape social and environmental conditions and which create inequities and (3) the impact of inequities on how parents manage infant food preferences and help infants 'learn to eat' (Birch and Anzman 2010, Birch and Doub 2014) within the contemporary food supply.

As this is a qualitative study of a small group of families from regional and rural areas we cannot conclude findings can be attributed to all Australian infants. As noted in studies with similar research design, perception bias, recall error, and social desirability bias are possible (Skafida 2013). Findings related to health and health attributes of foods should particularly be interpreted with caution, as our sample may have had particular interest or focus on health. This is possible due to: interview topic and interviewers' presentation; interviewees interest to be interviewed; and having a sample with over-representation of university graduates compared to national rates (Australian Bureau of Statistics 2011, Australian Bureau of Statistics 2007). Interviewers also asked interviewees to compare food choices with implied different health values such as 'fruit' and 'cake'. As per other research, health concerns are associated with food choice, but can vary across different lifestyle and demographic factors (Glanz and Basil 1998). Earlier ethnographic work with families also contextualised that 'a concern for good health was simply one amongst many competing sets of priorities which affect daily behaviours' (Backett 1992). Finally it is a limitation participants were not explicitly asked about breast or formula feeding as part of interviews. As this potentially provides further information about the context within which foods were chosen for infants and is also known to influence infant food preferences (Ventura and Worobey 2013).

Ethnographic research theory states that what people say and do depends on the social context in which they find themselves (Long 1984). It's therefore considered a strength of this study that interviews were conducted in key settings influencing food choices, including homes of participants, families, and local cafes. Future exploration studies of influences on infant diet would benefit from an *in-depth* interview approach focusing on aspects of this

topic. Interviewing participants from a range of socioeconomic backgrounds was considered a strength of this study, as well as a variable for further exploration.

In conclusion results reveal a range of influences on food choices mothers make for infants, however the magnitude of particular influences is not revealed. This remains to be explored if possible, given that food choice and eating are already identified as highly complex and context driven social practices(Delormier *et al.* 2009). Future research should investigate the extent key malleable factors interact to influence food choices made for infants. For example how cost of fresh fruits and particularly fresh vegetables (for which issues with perishability; cooking time and skills; infant acceptability; and health can be more pertinent) can contribute to whether parents are able to meet recommended dietary guidelines, such as repetitively offering new foods and a variety of foods to infants(NHMRC 2012), particularly for lower-income or resource limited parents.

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Key Messages

1. Food choices made for infants are influenced by wider social and environmental conditions and individual factors and circumstances.
2. Influences on food choices are all fundamentally shaped by socio-political, socio-economic, socio-environmental and socio-cultural circumstances experienced by parents, families and communities.
3. Choosing foods for infants is a complex social practice. Ecological frameworks depicting the multiple influences on what people eat and sociological theory on food choice regarding the role of 'social structure' and 'human agency', are both applicable to the process of choosing foods for infants.
4. Equity issues may be key regarding the degree to which mothers can choose particular foods for their infants (eg choosing foods which promote health).
5. This study is amongst the first research to explore multiple influences on choosing foods for infants and to demonstrate the applicability of a conceptual ecological framework to the influences on food choices made by parents for their infants.

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Table 1: Qualitative Interview Topic Guide – Food Choice Questions

<p>1. Now we are going to have a chat about the types of foods you eat. In a typical day what do you usually eat? Prompts/further questions¹:</p> <ol style="list-style-type: none"> Explore what types of foods they eat Breakfast, lunch, dinner Do you have any snacks? Does this differ on the weekend? Takeaway/eat out?
<p>2. Why do you eat X (fruit and veg / takeaway foods / biscuits /snacks etc)¹? Prompts/further questions:</p> <ol style="list-style-type: none"> What is the main reason for eating fruit and vegetables? What is the main reason for eating take away food? Snack foods – what is the main reason you have fruit for a snack instead of cakes or biscuits? Are there any other reasons why you choose to eat fruit as opposed to other types of snack foods? What is the main reason you have biscuits for morning tea? (cheap convenient etc) What is the main reason you choose to have a sandwich for lunch? What is the main reason you choose to have X for morning tea?
<p>3. Now we are going to focus on how people make choices when it comes to the foods and drinks they consume. We're really interested in not only you, but your children as well. I have here that this child is your Nth child, right? People often provide advice on what kinds of foods you should feed to your children. Has anyone ever told you how to feed your child? Prompts/further questions:</p> <ol style="list-style-type: none"> Who was this? Maternal and child health nurse Family members Books Friends When? Did you ask for their advice or did they just give it to you? Did you take notice of them? Why (not)?
<p>4. You said earlier you get information about what to feed your child from (maternal and child health nurse, family members, books, media etc) is there anywhere else you get information from? Prompts/further questions:</p> <ol style="list-style-type: none"> Family Friends Health professionals Media Advertising Books Other
<p>5. Excellent, now we would just like to ask you about the foods and drinks you give to your child. In a typical day what does your child eat? Prompts/further questions:</p> <ol style="list-style-type: none"> What is the main reason for giving your child X (fruit and veg, packaged snacks etc)? What is the main reason for giving your child X as opposed to fruit and vegetables for a snack/for lunch/for dinner? (Convenience, time, skills etc) Is food readily available for your child throughout the day?
<p>6. What factors do you feel impact on the food and drinks your child has? Prompts/further questions:</p>

<ul style="list-style-type: none"> a. What determines the food and drinks your child has? b. Where you are (home/out) – when out do you buy food, do you pack food to take with you – why do you pack food, why do you buy food (health reasons, cost, convenience, treat, skills etc) c. Cost d. Skills e. Knowledge f. Time pressures g. Child’s behaviour
<p>7. If your child is uncooperative when you give them certain foods and drinks what strategies do you use to overcome this behaviour?</p>
<p>8. So we have talked a lot about the foods and drinks you eat and what you give to your child, before we move on is there anything else you think we should know – about what’s important to you when making decisions about what to eat and drink?</p> <p>Prompts/further questions:</p> <ul style="list-style-type: none"> a. Marketing of food, time, cost, access
<p>9. Is there anything else you think we should know about what’s important to you when making decisions about how to feed your child?</p> <p>Prompts/further questions:</p> <ul style="list-style-type: none"> a. Marketing of food, time, cost, access
<p>10. Thinking about the types of foods and drinks that you would like to provide your child what would or does support you to be able to do this?</p> <p>Prompts/further questions:</p> <ul style="list-style-type: none"> a. Support from family, friends, types of foods available, types of foods child wants, how does child know what they want, shops, marketing?

¹Prompts and further questions listed are examples. The foods participants reported in questions 1 and 5 were generally the foods referred to in the prompts and further questions.

Table 2: Interviewee Characteristics

Mothers	n=32
Mean age (years)	32
Age range (years)	20 to 43
Number of children living with them (n):	
one	11 (34%)
two	10 (31%)
three	7 (22%)
four	4 (13%)
Speak English at home (n)	32 (100%)
Australian born (n)	29 (90%)
Schooling completed (n):	
secondary school	25 (78%)
bachelor level degree	11 (34%)
postgraduate degree	3 (9%)
Relationship status (n)	
Married or de facto	28 (88%)
Single or Never married or Separated or Divorced	4 (12%)
Health care card (held by either parent) (n) ¹	8 (25%)
Sole or dual responsibility for parenting, food preparation and purchase (n)	32 (100%)
Infants	
Mean age (months)	12
Age range (months)	4 to 15
Eating or had trialled some food (n) ²	32 (100%)

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¹ A card entitling reduced healthcare costs for low income households and/or people with chronic medical conditions

² Two infants had commenced eating or trialling food only recently to interview

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