

Grandparental dietary provision, feeding practices and feeding styles when caring for preschool-aged grandchildren: A systematic mixed methods review.

MARR, Colette <<http://orcid.org/0000-0003-4663-1345>>, REALE, Sophie <<http://orcid.org/0000-0003-2421-7661>>, BREEZE, Penny <<http://orcid.org/0000-0002-4189-8676>> and CATON, Samantha J <<http://orcid.org/0000-0002-9096-0800>>

Available from Sheffield Hallam University Research Archive (SHURA) at:
<http://shura.shu.ac.uk/27670/>

This document is the author deposited version. You are advised to consult the publisher's version if you wish to cite from it.

Published version

MARR, Colette, REALE, Sophie, BREEZE, Penny and CATON, Samantha J (2020). Grandparental dietary provision, feeding practices and feeding styles when caring for preschool-aged grandchildren: A systematic mixed methods review. *Obesity Reviews*.

Copyright and re-use policy

See <http://shura.shu.ac.uk/information.html>

Grandparental dietary provision, feeding practices and feeding styles when caring for preschool-aged grandchildren: A systematic mixed methods review

Colette Marr¹  | Sophie Reale²  | Penny Breeze³  | Samantha J. Caton¹ 

¹Public Health, School of Health and Related Research (SchHARR), University of Sheffield, Sheffield, UK

²Allied Health Professions, College of Health, Wellbeing and Life Sciences, Sheffield Hallam University, Sheffield, UK

³Health Economics and Decision Science, School of Health and Related Research (SchHARR), University of Sheffield, Sheffield, UK

Correspondence

Colette Marr and Samantha Caton, Public Health, School of Health and Related Research (SchHARR), University of Sheffield, Sheffield S1 4DA, UK.

Email: c.kearney@sheffield.ac.uk; s.caton@sheffield.ac.uk

Funding information

Wellcome Trust, Grant/Award Number: 108903/B/15/Z; University of Sheffield

Summary

Grandparents are frequently relied upon to care for their preschool-aged grandchildren. These early years are a crucial age in the development of dietary habits and preferences. This review aims to determine grandparental dietary provision, feeding practices and feeding styles when caring for their preschool-aged grandchildren. Medline, PsycInfo and Web of Science were searched in January 2020. A systematic mixed methods approach was used to synthesize the qualitative ($n = 13$) and quantitative ($n = 7$) articles describing grandparents' feeding styles ($n = 9$), feeding practices ($n = 14$) and dietary provision ($n = 18$). Grandparents are serving large portion sizes and encouraging their grandchildren to eat frequently. Results are mixed for the types of foods provided; grandparents provide discretionary foods high in sugar and fat, and some also choose more expensive core foods as treats (e.g., berries). Grandparents engage in feeding practices that promote healthy eating (e.g., creating a healthy feeding environment) and promote autonomy and independence (e.g., considering their grandchild's preferences). However, they also use some coercive feeding practices (e.g., using food as a reward) and may be using indulgent feeding styles, which can be conducive to obesogenic dietary intakes. Interventions targeting grandparents could be an effective way to improve dietary-related health outcomes in young children.

KEYWORDS

dietary provision, feeding styles and practices, grandparents, preschool children

1 | INTRODUCTION

Caregivers are often described as the nutritional gatekeepers for children, acting as agents through which children develop eating habits and preferences. Previous research has explored how parental behaviours impact upon children's eating, but grandparents, who are frequently called upon to provide childcare,^{1–3} may also play a pivotal feeding role. In comparison with the number of studies exploring the

role of parents in children's diets,^{4–6} there is very limited research exploring grandparental feeding behaviours when caring for their young grandchildren.

The early years are seen as a critical time for establishing healthy eating practices. This is because the food preferences and dietary behaviours formed during these years can track into later childhood and beyond.^{7–11} In a longitudinal study of 342 children, food choice and food variety at age 2–3 years old were significantly associated

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2020 The Authors. Obesity Reviews published by John Wiley & Sons Ltd on behalf of World Obesity Federation

with intake and variety at aged 22.¹¹ The food environment during these formative years can therefore have a significant impact on childhood and adulthood obesity.

Studies with parents have demonstrated that there may be three key mechanisms by which grandparents might influence children's food preferences and dietary behaviour: their dietary provision, the feeding practices they use and their feeding style.^{12,13} Dietary provision, defined here as the types, quantity and frequency that food is provided by caregivers, can have a direct influence on children's dietary behaviours. Studies have shown that caregivers are frequently offering young children larger than recommended portion sizes for meals, drinks and snack food items,¹⁴ which may be problematic because the more young children are offered, the more they will consume.^{15,16} Nevertheless, very little is known about grandparents' dietary provision to their grandchildren.

Feeding practices, on the other hand, influence dietary behaviours in a more indirect manner and are defined as "the specific goal directed behaviours used by caregivers to directly influence their children's behaviour".¹⁷ Although feeding practices are often used to influence children's eating behaviour positively, some practices have the opposite effect and lead to unintended negative outcomes. For example, caregiver restriction of food items, often used to limit high fat and high sugar foods, is associated with increased desire for, and consumption of, those restricted foods.¹⁸ Pressuring children to eat, most frequently used to increase consumption of low energy dense food items such as fruit and vegetables, is a predictor of food refusal and picky eating,¹⁹ and using food for emotion regulation can lead to children eating in the absence of hunger.²⁰ Nevertheless, some feeding practices such as ensuring that healthy foods are available in the home, modelling healthy food intake and encouraging balance and variety lead to positive dietary behaviours.⁵ A recent study of 1,076 Australian grandparents found that grandparents of grandchildren aged 3–14 years old were more likely to use more "positive" feeding practices, with encouraging balance and variety the most frequently reported positive practice.²¹ Whether this finding is true for grandparents of children younger than this and from other countries is something that requires further exploration.

Finally, caregivers' feeding style, defined as the emotional climate in which feeding interactions take place,⁵ can influence young children's eating behaviours. Four feeding styles (indulgent, authoritarian, authoritative and uninvolved), across two dimensions (responsiveness and demandingness), have been identified previously in caregivers of young children.⁵ These impact upon the types of food children consume, for instance in a study of 750 3–5 year olds, indulgent or uninvolved parenting styles were significantly associated with consuming higher energy dense foods and lower intakes of fruits and vegetables compared with authoritarian feeding styles.²² From a sociological perspective, being indulgent is integral to the role of being a grandparent,²³ and it is unknown if this translates to their feeding style.

Three reviews have been published previously investigating the relationship between grandparental behaviours and the diets of their grandchildren.^{24–26} Two of the reviews concluded that grandparents

were predominantly exhibiting negative feeding behaviours towards their grandchildren such as spoiling their grandchildren with food, providing energy dense, nutrient-poor food and drinks, using food to reinforce behaviour and providing too much food.^{24,26} In contrast, one review found mixed evidence for grandparental influence on children's eating behaviours.²⁵ For instance, whether grandparents had a positive or negative influence on mothers breastfeeding initiation and duration varied across cultures.²⁵ Nevertheless, several limitations of these reviews are of note. (1) The searches were conducted over 2 years ago and would benefit from being updated. (2) All of the reviews looked at a broad age range (0–18^{25,26} or 2–12²⁴); therefore, it is difficult to assess the impact of grandparents on the diets of children in the early years. Considering that grandparental feeding practices may differ depending on the grandchild's age,²¹ it is necessary to look at different age groups separately. (3) Two of the reviews focused on multiple lifestyle risk factors^{25,26} and did not provide an in-depth review of the relationship between grandparents' feeding behaviours and their grandchildren's eating behaviours. (4) The third review, that did focus specifically on dietary influences, used a limited search strategy and may have missed key papers.²⁴ Consequently, no review has provided a complete synthesis of evidence exploring grandparental feeding behaviours when caring for their preschool-aged grandchildren. Additionally, no review has attempted to synthesize the evidence according to these three feeding constructs (dietary provision, feeding practices and feeding style), and doing so may highlight the specific areas of feeding that grandparents need support with.

2 | AIM

The aim of this mixed methods review was to explore grandparental dietary provision, feeding practices and feedings styles when caring for their preschool-aged grandchildren.

3 | METHODS

A systematic mixed method approach was used to synthesize articles of both qualitative and quantitative methodology. The advantage of this design is that it can incorporate a wider pool of research to develop a broader understanding of a topic.^{27–30} This design is also particularly useful when there are limited number of studies conducted in the field.

3.1 | Search strategy

A search strategy was developed by identifying synonyms related to the population (grandparents and grandchildren) and outcome (diet, food and etc.) of interest. Literature and previously conducted reviews^{24–26} in the field were also scoped to identify key terms. Search terms within the population and within the outcome were

combined using the Boolean term OR. Population and outcome terms were combined using the Boolean operator AND. See supporting information for full search terms.

Using the defined terms, Medline, PsycInfo and Web of Science were searched in January 2020, and no limit on publication date was applied. Databases were searched via title, abstract and keywords. The reference list of included papers were hand searched for additional relevant titles. A Google Scholar search was conducted using modified search terms; the first 25 results pages were searched for further studies; after which, it was deemed that no articles were relevant for inclusion.

3.2 | Selection of studies

The first author (C.M.) screened titles, abstracts and full texts against the inclusion and exclusion criteria. Papers were included if they met all of the inclusion criteria and none of the exclusion criteria. A second independent reviewer (S.R.) screened 10% of the initial search results via title and abstract, and 10% of the full texts to ensure no relevant papers were excluded. The review was registered with Prospero, registration number: CRD42019121418.

3.3 | Inclusion and exclusion criteria

The review included papers that reported on grandparental feeding behaviours towards their grandchildren aged 2–4 years old. A full list of inclusion and exclusion criteria can be seen in Table 1.

3.4 | Quality appraisal

Study quality was assessed using methodologically appropriate tools. Qualitative, case-control and cohort studies were assessed using relevant critical appraisal skills programme checklists,^{31–33} and cross-sectional studies were assessed using the AXIS tool.³⁴ These tools assess key aspects of the design including aims, methodology and results to allow appraisal of study internal and external validity. Two reviewers (C.M. and S.R.) critically appraised all included papers. The heterogeneity across appraisal tools made it difficult to compare quality, and consequently, the reviewers assigned a scoring system to categorize the papers as low (meeting below 50% of appraisal tool criteria), moderate (50–75%) or high quality (>75%) to allow for comparison.²⁴ Disagreements regarding study quality were resolved by consensus.

TABLE 1 Inclusion and exclusion criteria

Variable	Inclusion	Exclusion
Population	Children aged 2–4 years old. Studies with an age range including children below aged 2 were included if they met the following criteria: 1) A mean or median age range within 2–4 years old Studies with an age range going beyond the age of 4 were included if they met both of the following criteria: 1) The maximum age was not beyond age 6 2) The mean or median age was within 2 to 4 years, 11 months	Child age not reported Studies only focusing on children aged 0–2 Studies only including children aged 5 and above
Intervention/exposure	Grandparents care for their grandchildren as informal carers Studies were not limited to those with only grandparents as study participants, but also those whereby parents expressed opinions on grandparental influence.	Grandparents as sole carers
Outcome	Grandchildren's diet Grandparents food provision Grandparental feeding style Grandparental feeding practices Studies with grandchildren's diet/ grandparental feeding behaviour outcomes and child weight outcomes	Child weight the only study outcome Focus on infant feeding, breastfeeding or weaning
Study design	All observational and experimental design Published in a peer-reviewed journal Studies from middle- and high-income countries (using classifications from the World Bank ³¹)	Studies from low-income countries (using classifications from the World Bank ³¹) Non-English language publications Abstracts Reviews (systematic or commentaries)

3.5 | Data extraction

The first reviewer (C.M.) extracted data related to the study design and outcome measures. A data extraction table was developed by the first reviewer (C.M.) and piloted. Data were extracted into a table under the following headings: study identifier, year, country, design, sample characteristics, child characteristics, grandparent care measurement, dietary measurement methods, relevant outcomes and for quantitative data, key results relating to dietary provision, feeding style and feeding practices (see supporting information). For qualitative data, participant quotations and author discussions related to dietary provision, feeding style and feeding practices from the results section of the paper were extracted into NVivo for analysis. The data extraction process was verified in two ways; a second reviewer (S.R.) completed the data extraction for 10% of the papers, and no disagreements were noted. A third reviewer (S.C.) cross-checked all data extraction entries by the first reviewer (CM) for accuracy and completeness.

3.6 | Data synthesis

Data from both quantitative and qualitative studies were synthesized under the three feeding constructs of dietary provision, feeding style and feeding practices using a results-based convergent synthesis design. This allows the qualitative and quantitative data to be analysed separately but integrated in the results section to address the three feeding constructs.³⁵ The qualitative data were analysed using thematic analysis of participant's quotes and relevant text from the results section of the papers.³⁶ A framework method of thematic analysis was adopted using a deductive approach³⁷ to identify codes and themes within the three identified feeding constructs (dietary provision, feeding style and feeding practices). The six phases of thematic analysis described by Braun and Clarke were followed closely for this synthesis,³⁸ which allowed the reviewer to identify, analyse and report patterns within the data. All texts were coded in NVivo, and themes were identified. The second reviewer (S.R.) cross-checked 10% of the results,

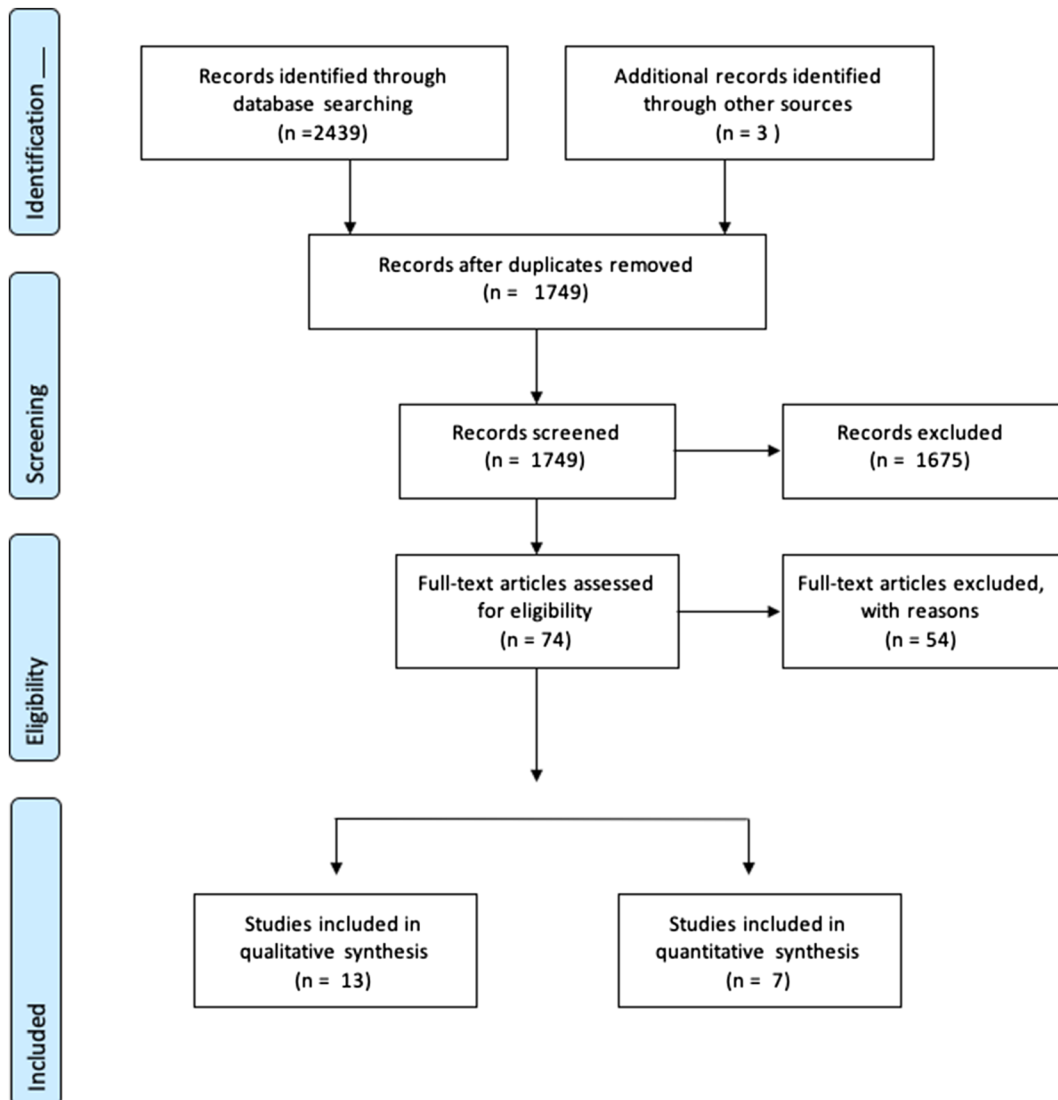


FIGURE 1 Flow diagram of search results

TABLE 2 Table of study characteristics of the qualitative studies included in the review

Study identifier	Country	Study design	Study sample	Child age (years)	Grandparent involvement
Eli et al. ³⁹	USA	Interviews	14 mothers, 8 fathers, 21 grandmothers, 6 grandfathers	3–5 (mean age = 4.6)	Grandparents who spend time with the grandchild at least twice a month
Eli et al. ⁴⁰	USA	Interviews	14 mothers, 8 fathers, 21 grandmothers, 6 grandfathers	3–5 (mean age = 4.6)	Grandparents who spend time with their grandchild at least twice a month
Neuman et al. ⁴¹	USA	Interviews	14 mothers, 8 fathers, 21 grandmothers, 6 grandfathers	3–5 (mean age = 4.6)	Grandparents who spend time with their grandchild at least twice a month
Mena et al. ⁴²	USA	Focus groups	34 mothers and 2 grandmothers	2–5	Not reported
Lindsay et al. ⁴³	China	Interviews	9 mothers, 3 fathers, 7 grandmothers, 4 grandfathers	3–6 (mean age = 4.4)	Grandparents looked after child most of the time
Yue et al. ⁴⁴	Australia	Interviews	9 grandmothers	1–5	Grandparent cared for grandchild ≥ 7 h/week
Pankhurst et al. ⁴⁵	Norway	Semi structured interviews	10 mothers, 1 father	2.5–5.5	Not reported
Rogers et al. ⁴⁶	Canada	Focus groups	34 mothers, 5 fathers	2–5	Not reported
Jiang et al. ⁴⁷	USA	Focus groups and interviews	51 Latino mothers	0–4	Not reported
Speirs et al. ⁴⁸	Australia	Interviews	22 parents, 3 grandparents	6 months to 5 years (mean 3.5)	Not reported
Vaughn et al. ⁴⁹	USA	Interviews	17 mothers/female guardians, 3 fathers	3–5 years	Not reported
Dwyer et al. ⁵⁰	UK	Focus groups	7 mothers, 5 grandmothers	0–5	Not reported
Toftemo et al. ⁵¹	Australia	Interviews and focus groups	10 grandmothers, 2 grandfathers	1–5	10 h per week or more

TABLE 2 (Continued)

Study identifier	Feeding assessment	Paper reported on			Quality appraisal score
		Dietary provision	Feeding style	Feeding practices	
Eli et al. ³⁹	Two questions on parental and grandparental (1) discussions and (2) agreement over child's diet	✓	✓	✓	High
Eli et al. ⁴⁰	Attitudes, knowledge and practices regarding preschool-aged children's beverage consumption	✓	✓	✓	High
Neuman et al. ⁴¹	Exploring gender, generation and socio-economic disadvantage in food provision	✓	✓	✓	High
Mena et al. ⁴²	Influences on what and how they feed their child	✓	✓	✓	High
Lindsay et al. ⁴³	Who is generally responsible for looking after the young child in your family? Who is responsible for family meals? What is your own view on how a small child should be fed?	✓	✓	✓	High
Yue et al. ⁴⁴	Views, perceptions and practices regarding dietary care, provision of treats, roles and responsibilities and challenges regarding feeding	✓	✓	✓	High
Pankhurst et al. ⁴⁵	Perceptions of their child's weight and the family's relationship within their extended family and with kindergarten	✓	✓	✓	High
Rogers et al. ⁴⁶	What experiences and challenges have you or other parents had in supporting healthy eating for preschoolers?	✓	✓	✓	High
Jiang et al. ⁴⁷	Perceptions of child's weight status and definition of overweight, child feeding practices related to overweight, and the role of socio-demographic, sociocultural and environmental influences on mothers' child feeding.	✓			Moderate
Speirs et al. ⁴⁸	Perceptions of factors that influence child sweet drink consumption	✓	✓	✓	High
Vaughn et al. ⁴⁹	Parental belief systems about preschoolers' healthy eating	✓			High
Dwyer et al. ⁵⁰	Experiences in receiving or giving informal childcare, perceived explanations of the relationship between informal childcare and childhood obesity	✓		✓	High
Toftemo et al. ⁵¹	The meaning and role of food treats among grandparents	✓	✓	✓	High

TABLE 3 Table of study characteristics of the quantitative studies included in the review

Study identifier	Country	Study design	Study sample	Child age	Grandparent involvement	Feeding assessment	Paper reported on		Quality appraisal score
							Dietary provision	Feeding style	
Srivastava et al. ⁵²	UK	Cross sectional survey	49 mothers, 1 father, 39 grandmothers, 11 grandfathers	2–8 (mean age = 4)	Grandparents reported caring for their grandchild on average for 14.24 h each week (SD = 8.65, range = 3–39)	Comprehensive feeding practices questionnaire	✓	✓	Moderate
Yue et al. ⁴⁴	China	Cross-sectional survey	460 grandmothers, 923 mothers	18–30 months (median age = 24 months)	Family member most responsible for child care	Feeding practices & 24 h recall for specific foods (staple foods, vegetables, fruits, meats, and eggs in the previous day). Dietary diversity coded as having food from more than four groups	✓	✓	Moderate
Speirs et al. ⁴⁸	USA	Cross-sectional survey	44 mothers, 18 grandmothers	2–6	Care for grandchild (including meal and snack times) at least once a week	26 food consumption behaviour questions, FFQ fruit and vegetable consumption. Are grandmothers involved in purchasing food for or feeding their preschool-aged grandchildren?	✓	✓	Low
Watanabe et al. ⁵³	Japan	Cross-sectional survey	1,765 parent-child dyads (1,222 in three-generation household)	3–6 (mean age = 4.2)	Two generation versus three generation household	Dietary habits questionnaire – skipping breakfast, having meals at regular times and eating snacks at fixed times.	✓		High
Sata et al. ⁵⁴	Turkey	Cross-sectional survey (case-control)	50 grandmothers, 150 mothers	2–5	Fed by their grandmother mean 4.72 days per week	Comprehensive feeding practices questionnaire		✓	Moderate
Kagamimori et al. ⁵⁵	Japan	Cohort study	8,835 parent-child dyads, 5,237 three-generational	3	Living with grandmother/grandfather in three generational household	Regular/irregular meal & snack intake	✓		Low
Metbulut et al. ⁵⁶	Japan	Cohort study	3,240 parents, 450 grandparents	3	Daytime care provider	Questionnaire: Between-meal eating Eating before bedtime	✓		High

and consensus was achieved on very minor coding disagreements through discussion.

4 | RESULTS

The search yielded 1,749 studies after duplicates ($n = 693$) were removed; 74 full-text papers were screened of which 17 studies met all of the inclusion criteria and none of the exclusion criteria for the review (Figure 1). Hand searches of the full-text reference lists and the google scholar search, identified a further three studies for inclusion. A total of 20 studies were included in the review (qualitative $n = 13$, quantitative $n = 7$). Of the included 20 articles, three stemmed from a single study.^{39–41} Although these three articles used the same participants and methods, the study aims and outcomes were different and therefore are treated as separate studies. Reasons for exclusion at the full-text screening stage include the following: article is a review ($n = 6$), no access to full text or English version ($n = 4$), the age range of the children (not specified, too young or too old) ($n = 22$), inability to differentiate between carers influence ($n = 5$), no measure/discussion of grandparent direct influence on child diet ($n = 15$) and grandparents were primary caregivers not informal caregivers ($n = 1$), and weight as an outcome ($n = 1$).

5 | STUDY CHARACTERISTICS

The characteristics of the included qualitative studies are presented in Table 2 and those of the quantitative studies in Table 3.

5.1 | Location

Eight of the studies were conducted in North America: in the United States^{39–43,48,52} and Canada.⁵⁰ Six of the studies were in Asia: in China,^{44,47} Japan^{53–55} and the Asian part of Turkey;⁵⁶ three were conducted in Europe: in the United Kingdom^{57,58} and Norway⁵¹ and three studies were conducted in Australia.^{45,46,59}

5.2 | Study design

Thirteen of the studies used a qualitative study design,^{39–43,45–47,50–52,58,59} eight of which used structured or semi-structured interviews^{39–41,45–47,51,52} and two used a combination of focus groups and interview techniques.^{43,59} The remaining three qualitative studies used focus group design.^{42,50,58} Of the quantitative studies ($n = 7$), four studies used cross-sectional design,^{44,48,53,57} one was a case-control study,⁵⁶ and two used data from a cohort study.^{54,55}

5.3 | Participants

This review includes data from 16,321 subjects reported across 20 studies. Of these, 16,064 were classified as parents with 11 studies

reporting whether these were mothers ($n = 1,242$) or fathers ($n = 21$).^{39–43,47,50–52,58} Mean ages of parents were reported in seven studies and ranged from 30 to 35.^{39–41,43,50,52,57} Across 14 studies, 1,097 grandparents participated,^{39–42,44–48,54,56–59} and 13 of these studies specified whether they were grandmothers ($n = 592$) or grandfathers ($n = 47$).^{39–42,44–48,54,56–58} Only six studies reported mean ages of grandparents and this ranged from 53 to 67 years old.^{39–41,48,57,59} In two studies, although grandparents were not recruited specifically as participants, data were collected on 6,459 three-generational households to assess the influence of grandparents coresidence.^{53,55}

Many of the studies ($n = 11$) did not report ethnicity but five of these 11 studies were interested in Chinese^{44,47} or Japanese^{53–55} participants. Nine studies did report ethnicity; in seven of these, over 90% of the sample were Caucasian;^{39–41,50,52,57,58} in one study, 60% were African American⁴⁸ and one study focused only on Latina mothers.⁴³

Twelve studies reported the educational level of parents or grandparents. Overall, grandparents tended to have less years in education than parents whereby between 17% and 100% of parents were reported to have attended higher education^{39–43,47,48,50–52,56,58} whereas between 8% and 39% of grandparents had.^{39–41,47,48,56}

5.4 | Quality appraisal

Based upon the results of the relevant quality appraisal tools, 13 studies were rated as high quality,^{39–42,45–47,50–52,54,58,59} five as moderate quality^{43,44,53,56,57} and two as low quality.^{48,55} The low quality ratings were mostly due to methodological weaknesses; not measuring outcomes using validated tools,⁵⁵ failing to consider confounding variables⁵⁵ and methodological reporting, poor reporting of statistical methods,⁴⁸ neglecting to justify chosen methods⁴⁸ and unclear ethical procedures.⁴⁸ As few studies have been published exploring grandparent's feeding behaviours when caring for their 2-to-4-year-old grandchildren, these studies were included in the review. Nevertheless, the results of those studies assessed as low quality^{48,55} should be interpreted with caution.

5.5 | Dietary provision

The first feeding construct relates to dietary provision. Within this category three main subthemes emerged: frequency of food provision, the types of food and drinks and the portion size of food and drinks provided.

5.5.1 | Frequency of food provision

In total, nine studies (quantitative $n = 3$,^{53–55} qualitative $n = 6$ ^{39,42,45,47,51,58}) referred to the frequency of which grandparents served meals or snacks to their grandchildren when in their

care. Two studies in Japan reported that three-generational households (where grandparents live with their grandchildren) were associated with unfixed⁵³ or irregular snack intake in children⁵⁵ but also regular meal times.⁵³ Similarly, in another Japanese study, the odds of 3-year-old boys and girls eating between meals three or more times per day was 2.9 and 2.5 times the odds when cared for by grandparents compared with when cared for by parents.⁵⁴ Likewise, two qualitative studies from the United Kingdom also suggested grandparents provide frequent snack foods^{39,58} and are more likely to provide confectionary than parents,³⁹ even though grandparents may discourage snacking before meal times.⁵⁸ In another study, in the United States, Latina mothers complained that their parents were frequently serving their children junk food before meals.⁴² However, Australian grandparents described how they ensured their grandchildren did not eat too close to a meal so as to not spoil their appetite, or if their grandchildren were really hungry they would only provide a healthy option like fruit.⁴⁵

Qualitative interviews with parents and grandparents also described how grandparents focus their attention on providing set meals^{39,45} but often this was to their grandchild's detriment as they may encourage children to eat more frequently. For instance, it was noted in two studies that grandparents often served an additional meal, even if their grandchild had eaten that meal previously, while in childcare, for example, lunch.^{47,51}

5.5.2 | Types of food and drink served

The review identified 14 studies (quantitative $n = 2$,^{44,48} qualitative $n = 12$ ^{39-42,45-47,50-52,58,59}) that reported on the types of food that grandparents provide to their grandchildren. Two out of 12 studies focused specifically on fruit and vegetable consumption. For example, a US observational study compared the food served to children by parents and grandparents.⁴⁸ The authors reported that more grandparents served fruit in an evening meal than parents (39% vs. 25% respectively) and that a similar number of parents and grandparents served vegetables (75% vs. 73%, respectively). Although this suggests that grandparents may have a positive influence on their grandchildren's diets, the low quality of this paper means that these results should be interpreted with caution. Similarly, a study conducted in China reported contrasting results to this US study, finding that grandparents were significantly less likely to provide vegetables ($-0.19, p < 0.05$) and fruit ($-0.16, p < 0.05$) to their grandchild than the parents were.⁴⁴

Discrepancies were also evident across the qualitative studies that explored the types of food grandparents provide. Although a majority of the studies indicated that grandparents typically provide unhealthy food such as those with high fat and/or high sugar content, for example, chocolates, sweets and other junk food items,^{39,42,46,47,50-52,58} some studies suggested that grandparents provide healthy food to their grandchildren.^{41,45} For instance, grandparents in Australia described how they frequently used core foods as treats, such as cheese and fruit and buy novel or more expensive but

healthy items that the parents found too costly.⁴⁵ Nevertheless, grandparents did provide discretionary items as treats occasionally, believing that exposing their grandchildren to some discretionary items would allow them to develop self-control and learn to moderate their own intake.⁴⁵

Evidence on grandparents drinks provision was also mixed, despite grandparents and parents agreeing on which beverages are healthy/unhealthy.⁴⁰ Grandparents in one study had stricter rules than parents on sugary drinks provision. For example, not using beverages as treats and using low fat or low sugar substitutes for more unhealthy drinks.⁴⁰ This finding is in contrast to what was reported in four other studies, which described grandparents as providing frequent sugary drinks to their grandchildren.^{39,42,51,59}

5.5.3 | Portion size of food served

Three qualitative studies^{43,47,50} reported on the portion size of food that grandparents provided to their grandchildren; no quantitative evidence was found. When parents in the United States were interviewed, they described grandparents serving "huge quantities of chips and candy" to their grandchildren.⁵⁰ Another study interviewing Latina mothers described grandparents who feed their grandchildren as if they were "stuffing a bag".⁴³ Chinese grandparents were also accused of overfeeding their grandchildren, providing large portion sizes and encouraging their grandchildren to eat more even if the grandchild is full.⁴⁷ In Latina and Chinese grandparents, this feeding behaviour stemmed from grandparents preference for overweight in children,^{43,47} and some Chinese grandparents held the belief that overweight children will be thin when they grow up, or that eating more will help their grandchildren to grow taller.⁴⁷

5.6 | Feeding practices

Fourteen studies reported on grandparental feeding practices (quantitative $n = 3$,^{44,56,57} qualitative $n = 11$ ^{39-42,45-48,51,58,59}). Feeding practices have been synthesized using the framework of three higher order food parenting constructs proposed by Vaughn and colleagues: structure, autonomy and coercive control.⁴⁹

5.7 | Structure

Grandparents may engage in some feeding practices that provide structure to children's eating environment and promote healthy eating behaviours in children. For instance, in a UK study comparing parent and grandparent feeding practices, grandparents were more likely than parents to create a healthy feeding environment.⁵⁷ Similarly, when grandparents from the United States were interviewed, grandparents discussed how they ensured that their grandchildren had access to healthy choices in their home, with specific reference to the choice of beverages.⁴⁰ Grandparents may also model appropriate food

and drink consumption, for instance when Australian grandparents were interviewed about their treat provision, it was evident that grandparents were mindful of what they were consuming in the presence of their grandchildren and understood the importance of modelling healthy behaviours.⁴⁵ Similarly, grandparents from the United States described how they modelled healthy beverage consumption after observing the mother's modelling techniques regarding sugary drinks.⁴⁰ However, two studies comparing the feeding practices of parents and grandparents suggest that grandparents may be less likely than parents to engage in some feeding practices that promote healthy eating behaviours. In these studies, grandparents were less likely to model healthy eating behaviours,^{56,57} promote variety and a well-balanced food intake^{56,57} and less likely to monitor intake⁵⁶ than parents.

5.8 | Autonomy

Grandparents may also engage in feeding practices that help to promote autonomy and independence in children. For instance, in two studies, grandparents described how they spend time to teach their grandchildren about nutrition and communicate about healthy eating to allow their grandchildren to make healthy choices themselves,^{40,46} although not all grandparents saw this as their role or responsibility.⁴⁶ Moreover, five qualitative studies demonstrated how grandparents consider their grandchildren's food and drink preferences,^{42,46,47,51,58} for meal choice,⁴⁷ drinks and snacks.^{42,46,51} Nevertheless, this was often done in a permissive manner^{42,46,51,58} and in one study was framed as grandparents being unable to say no to their grandchildren's requests.⁵⁸ Similarly, although grandparents from the United States described how they wanted to create a balanced eating environment and prevent their grandchildren from becoming fixated on unhealthy foods, they framed this as a justification for their excessive provision of treat foods and snacks.³⁹

5.9 | Coercive control

Grandparents were also described as using coercive feeding practices. Coercive practices are often used to impose the caregiver's own desires and influence a child's socialization around food. They include pressure, restriction and using food to control behaviour or emotions, and they can have a negative impact on eating behaviours and preferences.⁴⁹ Restriction was the most commonly reported of these feeding practices, whereby five qualitative studies^{40,42,45-47} and two quantitative studies^{56,57} highlighted that grandparents use restriction practices. Grandparents in one study restricted carbonated sugar-sweetened beverages (SSBs) for health reasons,⁴⁰ whereas in another study, grandparent's restriction of food items was more likely to be for weight concerns⁵⁷ than parents. Australian grandparents, in another study, chose to restrict items based on sugar and food-additive content rather than restricting items based upon salt and fat content.⁴⁶ Their grandchild's behaviour was also a motivating factor

for restriction, rather than nutritional concerns.⁴⁶ Grandparents may also choose to restrict food items when a main meal is imminent for fear of spoiling their grandchildren's appetites.⁴⁶ Interestingly, although grandparents do use restriction practices, some grandparents did acknowledge that prohibiting food and drink items entirely can have negative consequences.^{40,45}

Four studies reported grandparents using food or drinks as a reward for behaviour,^{40,45-47} whether this was withholding treat foods (e.g., fast food items) due to negative behaviours⁴⁷ or rewarding good behaviours with snack foods (e.g., ice cream and chips/crisps).⁴⁵⁻⁴⁷ Some grandparents only used food to reward their grandchildren's behaviour to align with parental practices, particularly to reinforce toilet training.⁴⁵ In the same study, grandparents were also opposed to using food to regulate their grandchildren's emotions, yet in other studies, grandparents were more likely than parents to use food to regulate their grandchildren's emotions.^{56,57}

Pressuring grandchildren to eat was also a theme that emerged from one qualitative study in China.⁴⁷ This included encouraging grandchildren to eat in the absence of hunger, to finish food in the bowl and to have second servings of food. Grandparents reportedly used pressure to prevent food waste and encourage greater consumption. Other reasons for pressuring their grandchildren to eat include having painful memories of hunger themselves and not wanting their grandchildren to experience this. Also, some grandparents had inaccurate perceptions of both child weight status (strong not fat) and consequences of eating more (becoming tall) and therefore pressured their grandchildren to eat.

5.10 | Feeding style

Nine qualitative studies implicitly referred to grandparents feeding styles.^{39-41,45-47,50,51,59} Most made reference to grandparents "indulging", "spoiling", "treating" or being "permissive",^{39,40,45-47,50,51} and this was often framed within being a grandparents role or privilege.^{39,40,46,51} These references emerged across cultures, including studies from the United States, Australia, Canada, Norway and China. Grandparents rationalized their indulgent feeding style as a way of counteracting parents strictness, introducing a sense of fun and creating a bond with the child³⁹ as well as a way to transmit love.⁴⁷ Grandparents believed that being indulgent was inconsequential due to the limited time they spent caring for their grandchild.^{40,46} Although grandparents in one study were often indulgent, providing their grandchildren with food items they requested, they did not want to be manipulated by their grandchildren.⁴⁵ To overcome this, grandparents had rules and boundaries, particularly regarding the number of treats their grandchildren could have in one go,⁴⁵ suggesting that a more authoritative feeding approach is adopted by some.⁴⁵ Three other studies referred to grandparents having rules and being strict with food and drink provision.^{40,41,59} This could also reflect either an authoritative or an authoritarian feeding style, but it was unclear if these rules were accompanied by a responsiveness to their grandchild's preferences and needs or not, which would clarify this.

6 | DISCUSSION

This review identified 20 studies that reported grandparental feeding behaviours when caring for their 2- to 4-year-old grandchildren. This included both qualitative and quantitative studies of mostly high and moderate quality from a wide range of countries. The findings are described using three concepts: dietary provision, feeding practices and feeding styles.

6.1 | Dietary provision

The evidence suggests that grandparents might be serving large portion sizes and encouraging their grandchildren to eat frequently, offering snacks and additional meals to their preschool-aged grandchildren. However, the evidence is less clear regarding the types of food and drink provided. Although a majority of the studies indicated that grandparents are typically providing unhealthy food and drink items high in fat and sugar, there was also evidence to suggest grandparents provide healthy options to their grandchildren, using core foods as treat items and providing fruit and vegetables with meals. Discrepancies may result from differences between parental and grandparental report; for instance, within a single study in Australia, grandparents described themselves as being strict with sugary drink consumption, whereas parents of the same children described grandparents as regularly offering fruit juice and soft drinks.⁵⁹ Another finding is that grandparents value their role as a provider of meals for preschool-aged children. Sometimes, this led to grandparents providing a meal that the child had already eaten elsewhere so, for example, the child would eat two evening meals. Even though none of the included studies assessed the content of meals provided by grandparents, consuming regular meals is associated with higher fibre intake, lower added sugar intake and better diet quality.⁶⁰ Consequently, this behaviour may have a positive effect on the diets of preschool-aged children.

6.2 | Feeding practices

The results for feeding practices were also mixed. Grandparents demonstrated some feeding practices that provide structure to a child's eating environment such as creating a healthy food environment, ensuring healthy food is accessible to their grandchildren and modelling healthy eating, which are all conducive to healthy food intake in children.^{61,62} This is particularly important because in a study of Australian grandparents, creating a healthy food environment and having healthy food available and accessible in the home was the strongest predictor of child diet quality compared with other feeding practices.²¹ Moreover, the results of this review suggest that grandparents use some feeding practices that may help to support their grandchildren's autonomy and independence with food and drink, such as teaching their grandchildren about nutrition and considering their grandchildren's preferences and choices.⁴⁹ Nevertheless, it is difficult to distinguish between grandparents considering their

grandchildren's preferences and being permissive. Evidence suggests that grandparents are also engaging in some feeding practices that are coercive in nature such as restriction, using food as a reward or for emotional comfort and pressuring grandchildren to eat, which correlate with children's unhealthy food consumption.^{61,62} Studies of parental feeding practices suggest that these coercive practices are also adopted by parents of children this age but may vary depending on child weight status, parental ethnicity and child sex.⁶³⁻⁶⁵ It may therefore be useful to explore the variation in the use of different feeding practices across distinctive characteristics of grandparents and grandchildren. It is also worth noting that there is not always a straight forward relationship between feeding practices and eating behaviour. For instance, the ways in which caregivers choose to restrict food and drink items may influence children's eating behaviour positively or negatively. Covert restriction, whereby children are unaware that caregivers are restricting food and drink items, can promote the consumption of healthy foods in children, whereas overt restriction, whereby the child is aware of the food or drink being restricted, can increase child consumption of these restricted items.^{66,67} None of the studies in this review explored these constructs explicitly, and therefore, it is unknown if grandparents use overt or covert methods when they restrict food and drink items. However, in a few studies, grandparents understood that forbidding food entirely, a key characteristic of overt restriction, can have negative consequences.⁶⁶

Another oversight of the literature reviewed here is that none of the studies considered how the behaviour of the grandchild might shape the feeding behaviours of grandparents. Some child eating behaviours, for example, satiety responsiveness and slowness in eating, are, at least in part, genetically driven,^{68,69} and evidence indicates that child eating behaviours can precede and drive caregiver feeding behaviours.^{70,71} For instance, fussy eating in young children is predictive of caregivers use of coercive feeding practices such as pressuring to eat, using food as a reward and overt restriction.^{71,72} No study in this review captured child eating behaviours, and therefore, we do not know if grandparents feeding practices are used in response to child eating behaviours or vice versa. Exploring the direction of the relationship between grandparents feeding practices and their grandchildren's eating behaviours may be a key future direction for research.

6.3 | Feeding style

Finally, this review found that grandparents predominantly use an indulgent feeding style with their preschool-aged grandchildren, confirming that being indulgent is a common part of the grandparenting role.²³ Indulgent feeding styles are characterized by being responsive to children's needs and preferences but having few rules and demands on their grandchildren's needs. This is important because compared with the authoritarian feeding style, an indulgent feeding style is associated with increased intake of energy dense, nutrient poor foods⁷³ and a decreased intake of fruit and vegetables.²² Consequently, an

indulgent feeding style is negatively associated with preschoolers' weight status.⁷⁴

Other reviews have found that grandparents predominantly have a negative influence on the diets of children aged 0–18 years old^{24,26}; however, this review suggests that the relationship between grandparental care and preschool-aged children's eating is less clear. The age of the grandchild may explain these differences, whereby grandparents feeding mechanisms differ for preschool-aged children compared with older children. This argument is supported by a recent study which found that grandparents of younger grandchildren were more likely to give praise to their grandchildren for healthy eating, set limits of unhealthy food consumption and use food as a reward than grandparents of older grandchildren.²¹ Whether child age influences grandparent's dietary provision and feeding style however is still unknown and requires further comparative studies.

A strength of this review is that it not only focuses on preschool-aged children but also explores the mechanisms by which grandparents may be influencing their grandchildren's diets. The early years are an important time when dietary habits and preferences are formed, and this review provides evidence that targeting grandparents may be beneficial in improving the diets of young children and, due to the sustained nature of eating habits in childhood, children's health in later life. This review also included participants from a wide range of countries, representing numerous ethnicities, although limited homogeneity across study outcomes prevented a detailed assessment of differences between them.

Several limitations are also of note. First, there was great heterogeneity between the study methods and outcomes. For instance, this review included studies where parents were reporting on grandparental behaviours. As inconsistencies were found within studies between parent and grandparent reports, these inclusion criteria may bias the results. The review also included studies of low quality, potentially weakening the validity of the results. However, due to the limited number of studies published in the area, these inclusion criteria were deemed justifiable. Another limitation of the review was the inclusion of studies across different nationalities and cultures. Although similarities were seen across these, caution needs to be taken when applying the results to a specific population, and further research is needed to explore the specific influence of culture on grandparental behaviours. Finally, feeding styles are a complex phenomenon, defined by multiple criteria, and no study identified in the review used a validated tool to assess them. This means that grandparental feeding style can only be inferred from the data available and a validated tool would provide a more reliable and accurate depiction of the feedings styles grandparents are adopting.

This review has highlighted several gaps in the literature. No study has rigorously assessed the dietary provision of grandparents to preschool-aged children using dietary assessment methods that capture more than just fruit and vegetable intake or snack intake. Likewise, evidence on the types of food that grandparents are providing often come from parental report. Considering that grandparents are often relied upon for childcare when parents are unable to provide it themselves, parental perspectives of what grandparents do in their

absence may not be wholly accurate. Consequently, it is very difficult to establish the overall dietary quality that grandparents are providing to their grandchildren; thus, further quantitative studies are needed. Similarly, no study has assessed grandparental feeding styles using a validated feeding styles tool, and as discussed, this is needed to fully examine their feeding styles and how they might influence their grandchildren's dietary intake. Doing so may also help to establish whether grandparent's indulgent feeding styles are analogous to parent's indulgent feeding styles.

Few studies have explored the relationship between the amount of time that grandparents spend with their preschool aged grandchildren and their feeding behaviours. A recent study found that 3- to 14-year-old grandchildren cared for regularly by their grandparents were more likely to consume both healthy (fruits and vegetables) and unhealthy (sugary and savoury snacks and sugary drinks) foods compared with those cared for by their grandparents less frequently.²¹ This suggests that increased time in grandparental care may have both a positive and negative effect on children's eating behaviours. Moreover, further research is needed to explore how the amount of time grandparents spend caring for their preschool-aged grandchildren impacts upon their dietary provision, feeding styles and feeding practices.

Further exploration is also needed into the intergenerational nature of feeding behaviours. No study explored how feeding styles may be similar between related parents and grandparents, but there is some evidence to suggest this is the case for feeding practices. For instance, one study explored the correlation between related mother's and grandmother's feeding practices and found significant correlations between their use of pressure to eat, restriction and encouragement of energy balance,⁵⁶ suggesting that these behaviours may be passed down generationally from grandparent to parent. In another study, although similarities were found between parent and grandparent feeding practices, these parents and grandparents were independent and unrelated.⁵⁷ Eli et al³⁹ found that grandparents residing in intergenerational households had similar feeding attitudes to parents, but this may be a consequence of residing in the same home. Similarly, grandparents often described conforming to parental rules and practices.^{39,46} It is evident that further work is needed to characterize the intergenerational nature of feeding behaviours and explore whether they are learnt behaviours or if these similarities are a result of cooperation and agreement in approaches. Doing so would also help to establish whether grandparents used similar feeding practices or adopted an indulgent feeding style with their own children or if it is unique to the grandparenting role.

Considering the results of this review and the gaps within the literature, the authors propose a set of recommendations (Figure 2) for future research exploring the relationship between grandparents feeding behaviours and their preschool-aged grandchildren's eating behaviours.

It is clear from this review that grandparents play an important role in caring for their grandchildren in the early years and they may need support to modify their feeding styles, practices and food provision. Being indulgent may be embroiled within what it means to be a

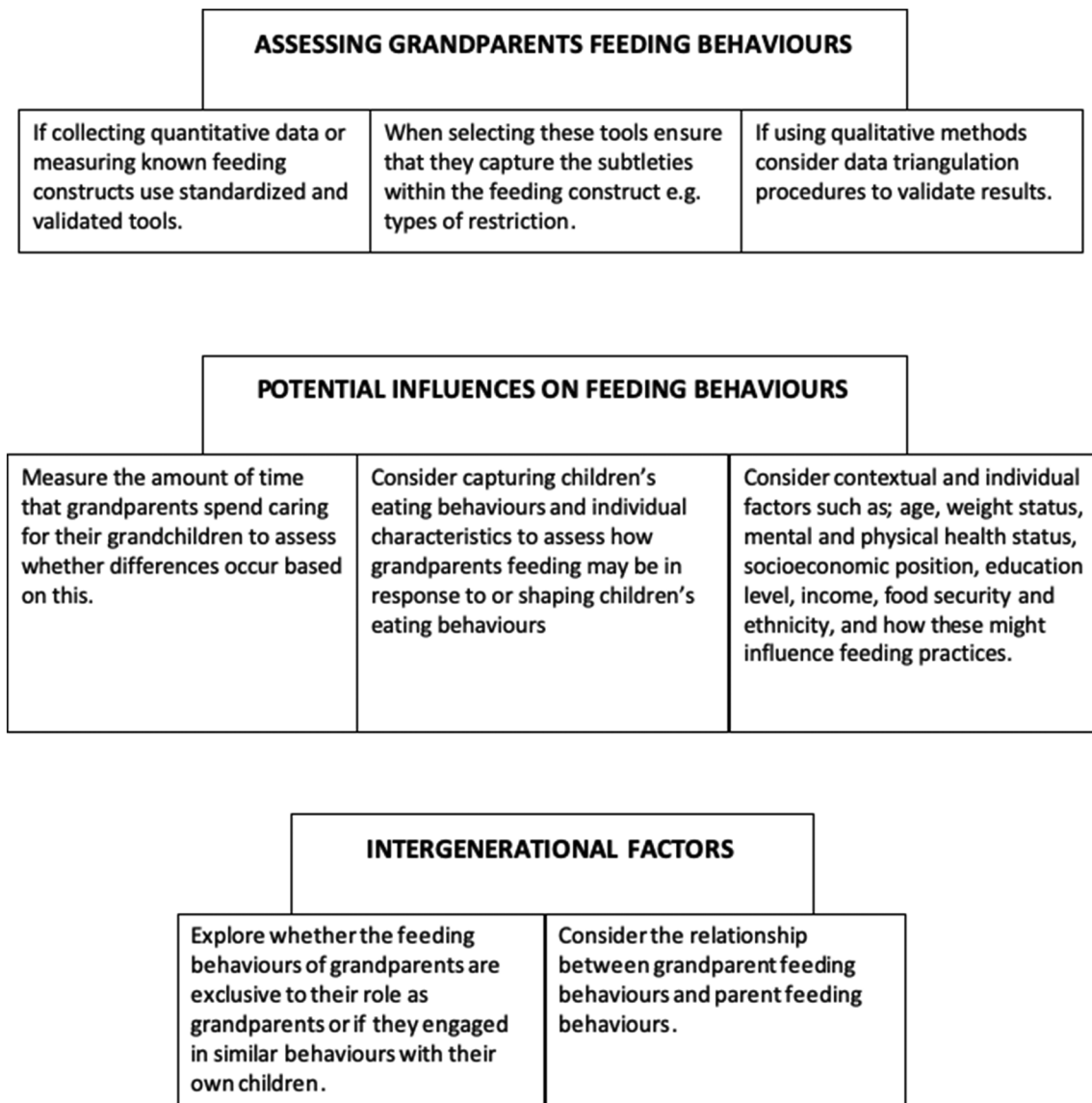


FIGURE 2 Recommendations for future studies assessing the relationship between grandparent care and preschoolers' diet

grandparent, and campaigns could encourage grandparents to be indulgent with their time, attention and activities rather than with food and drinks. Similarly, strategies could be developed to encourage grandparents to use non-food-based rewards and to refrain from using food as an emotional comfort. However, it is important to note that this review focuses specifically on feeding and does not account for the potentially positive and supportive role that grandparents play in their grandchildren's social and emotional wellbeing^{3,75-77} and this should not be ignored. The results of this review do not suggest that grandparents care should be limited, rather that healthy eating initiatives targeting parents should be widened to ensure grandparents also receive support with their feeding.

In conclusion, grandparents use a range of feeding practices to influence their preschool-aged grandchildren's eating, and some of these, such as creating a healthy eating environment, may lead to healthful eating in young children, but some of these, such as using

food as a reward, may lead to negative eating outcomes. An indulgent feeding environment was also documented widely in grandparents caring for their preschool-aged grandchildren as well as evidence that grandparents offer large and frequent snacks and meals. Grandparents are therefore an important group to target to improve dietary-related health outcomes in young children. Nevertheless, there is still a need to use validated tools to assess grandparental feeding styles and to directly measure grandparent's overall dietary provision. Only then can interventions be designed that are sensitive to both the positive and negative influences that grandparents have on the diets of their 2- to 4-year-old grandchildren.

ACKNOWLEDGEMENTS

This work was supported by funding from Wellcome Trust (108903/B/15/Z) and the University of Sheffield.

AUTHOR CONTRIBUTIONS

C.M., S.C. and P.B. contributed to the conception of this review; C.M. designed the study; C.M., SC and S.R. carried out study selection, data extraction, quality appraisal and data analysis; C.M. drafted the paper; S.C., P.B. and S.R. critically revised the paper. All authors have read and approved the content of the review.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

ORCID

Colette Marr  <https://orcid.org/0000-0003-4663-1345>

Sophie Reale  <https://orcid.org/0000-0003-2421-7661>

Penny Breeze  <https://orcid.org/0000-0002-4189-8676>

Samantha J. Caton  <https://orcid.org/0000-0002-9096-0800>

REFERENCES

- Department for Education. Childcare and early years survey of parents in England 2017.
- Jongenelis MI, Talati Z, Morley B, Pratt LS. The role of grandparents as providers of food to their grandchildren. *Appetite*. 2019;134:78-85. <https://doi.org/10.1016/j.appet.2018.12.022>
- Buchanan A, Rotkirch A. Twenty-first century grandparents: global perspectives on changing roles and consequences. *Contemp Soc Sci*. 2018;13(2):131-144. <https://doi.org/10.1080/21582041.2018.1467034>
- Savage JS, Fisher JO, Birch LL. Parental influence on eating behavior: conception to adolescence. *J Law Med Ethics*. 2007;35(1):22-34. <https://doi.org/10.1111/j.1748-720X.2007.00111.x>
- Blissett J. Relationships between parenting style, feeding style and feeding practices and fruit and vegetable consumption in early childhood. *Appetite*. 2011;57(3):826-831. <https://doi.org/10.1016/j.appet.2011.05.318>
- Wang L, van de Gaar VM, Jansen W, Mieloo CL, van Grieken A, Raat H. Feeding styles, parenting styles and snacking behaviour in children attending primary schools in multiethnic neighbourhoods: a cross-sectional study. *BMJ Open*. 2017;7(7):e015495. <https://doi.org/10.1136/bmjopen-2016-015495>
- Brunstrom JM, Mitchell GL, Baguley TS. Potential early-life predictors of dietary behaviour in adulthood: a retrospective study. *Int J Obes (Lond)*. 2005;29(5):463-474. <https://doi.org/10.1038/sj.ijo.0802890>
- Skinner JD, Carruth BR, Bounds W, Ziegler P, Reidy K. Do food-related experiences in the first 2 years of life predict dietary variety in school-aged children? *J Nutr Educ Behav*. 2002;34(6):310-315. <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med4&NEWS=N&AN=12556269>
- Rollins BY, Loken E, Birch LL. Stability and change in snack food likes and dislikes from 5 to 11 years. *Appetite*. 2010;55(2):371-373. <https://doi.org/10.1016/j.appet.2010.06.012>
- Nicklaus S, Boggio V, Chabanet C, Issanchou S. A prospective study of food preferences in childhood. *Food Qual Prefer*. 2004;15(7-8):805-818. <https://doi.org/10.1016/j.foodqual.2004.02.010>
- Nicklaus S, Boggio V, Chabanet C, Issanchou S. A prospective study of food variety seeking in childhood, adolescence and early adult life. *Appetite*. 2005;44(3):289-297. <https://doi.org/10.1016/j.appet.2005.01.006>
- Golan M. Parents as agents of change in childhood obesity—from research to practice. *Int J Pediatr Obes*. 2006;1(2):66-76. <https://doi.org/10.1080/17477160600644272>
- Lindsay AC, Sussner KM, Kim J, Gortmaker SL. The role of parents in preventing childhood obesity. *Future Child*. 2006;16(1):169-186. <https://doi.org/10.1353/foc.2006.0006>
- Infant and Toddler Forum. Healthy eating for toddlers. <https://www.infantandtoddlerforum.org/toddlers-to-preschool/portionsizes/portion-sizes-survey>. Accessed March 27, 2019.
- Fisher JO, Kral TVE. Super-size me: portion size effects on young children's eating. *Physiol Behav*. 2008;94(1):39-47. <https://doi.org/10.1016/j.physbeh.2007.11.015>
- Reale S, Hamilton J, Akparibo R, Hetherington MM, Cecil JE, Caton SJ. The effect of food type on the portion size effect in children aged 2–12 years: a systematic review and meta-analysis. *Appetite*. 2019;137:47-61. <https://doi.org/10.1016/j.appet.2019.01.025>
- Shloim N, Edelson LR, Martin N, Hetherington MM. Parenting styles, feeding styles, feeding practices, and weight status in 4-12 year-old children: a systematic review of the literature. *Front Psychol*. 2015;6:1849. <https://doi.org/10.3389/fpsyg.2015.01849>
- Ventura AK, Birch LL. Does parenting affect children's eating and weight status? *Int J Behav Nutr Phys Act*. 2008;5(1):15. <https://doi.org/10.1186/1479-5868-5-15>
- Galloway AT, Fiorito L, Lee Y, Birch LL. Parental pressure, dietary patterns, and weight status among girls who are "picky eaters". *J am Diet Assoc*. 2005;105(4):541-548. <https://doi.org/10.1016/j.jada.2005.01.029>
- Blissett J, Haycraft E, Farrow C. Inducing preschool children's emotional eating: relations with parental feeding practices. *Am J Clin Nutr*. 2010;92(2):359-365. <https://doi.org/10.3945/ajcn.2010.29375>
- Jongenelis MI, Morley B, Pratt IS, Talati Z. Diet quality in children: a function of grandparents' feeding practices? *Food Qual Prefer*. 2020;83:103899. <https://doi.org/10.1016/j.foodqual.2020.103899>
- Hoerr SL, Hughes SO, Fisher JO, Nicklas TA, Liu Y, Shewchuk RM. Associations among parental feeding styles and children's food intake in families with limited incomes. *Int J Behav Nutr Phys Act*. 2009;6(1):55. <https://doi.org/10.1186/1479-5868-6-55>
- Kivnick HQ. Dimensions of grandparenthood meaning: deductive conceptualization and empirical derivation. *J Pers Soc Psychol*. 1983;44(5):1056-1068. <https://doi.org/10.1037/0022-3514.44.5.1056>
- Young KG, Duncanson K, Burrows T. Influence of grandparents on the dietary intake of their 2-12-year-old grandchildren: a systematic review. *Nutr Diet*. 2018;75(3):291-306. <https://doi.org/10.1111/1747-0080.12411>
- Pulgaron ER, Marchante AN, Agosto Y, Lebron CN, Delamater AM. Grandparent involvement and children's health outcomes: the current state of the literature. *Fam Syst Health*. 2016;34(3):260-269. <https://doi.org/10.1037/fsh0000212>
- Chambers SA, Rowa-Dewar N, Radley A, Dobbie F. A systematic review of grandparents' influence on grandchildren's cancer risk factors. *PLoS ONE*. 2017;12(11):e0185420. <https://doi.org/10.1371/journal.pone.0185420>
- van Grootel L, Balachandran Nair L, Klugkist I, van Wesel F. Quantizing findings from qualitative studies for integration in mixed methods reviewing. *Res Synth Methods*. 2020;11(3):413-425. <https://doi.org/10.1002/jrsm.1403>
- Voils CI, Sandelowski M, Barroso J, Hasselblad V. Making sense of qualitative and quantitative findings in mixed research synthesis studies. *Field Methods*. 2008;20(1):3-25. <https://doi.org/10.1177/1525822X07307463>
- Sandelowski M, Voils CI, Barroso J. Defining and designing mixed research synthesis studies. *Res Sch*. 2006;13(1):29. <http://www.ncbi.nlm.nih.gov/pubmed/20098638> Accessed March 24, 2020
- Heyvaert M, Maes B, Onghena P, Maes B. Mixed methods research synthesis: definition, framework, and potential. *Johnson and Onwuegbuzie*. 2013;47:659-676. <https://doi.org/10.1007/s11135-011-9538-6>
- Critical Appraisal Skills Programme. CASP qualitative checklist. 2019. <https://casp-uk.net/wp-content/uploads/2018/03/CASP->

- Qualitative-Checklist-2018_fillable_form.pdf. Accessed January 12, 2020.
32. Critical Appraisal Skills Programme. CASP cohort study checklist. 2019. https://casp-uk.net/wp-content/uploads/2018/03/CASP-Cohort-Study-Checklist-2018_fillable_form.pdf. Accessed January 12, 2019.
 33. Critical Appraisal Skills Programme. CASP case control checklist. 2019. https://casp-uk.net/wp-content/uploads/2018/03/CASP-Case-Control-Study-Checklist-2018_fillable_form.pdf. Accessed January 12, 2019.
 34. Downes MJ, Brennan ML, Williams HC, Dean RS. Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS). *BMJ Open*. 2016;6(12). <https://doi.org/10.1136/bmjopen-2016-011458>
 35. Hong QN, Pluye P, Bujold M, Wassef M. Convergent and sequential synthesis designs: implications for conducting and reporting systematic reviews of qualitative and quantitative evidence. *Syst Rev*. 2017;6(1):61. <https://doi.org/10.1186/s13643-017-0454-2>
 36. Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Med Res Methodol*. 2008;8(1):45. <https://doi.org/10.1186/1471-2288-8-45>
 37. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol*. 2013;13:117. <https://doi.org/10.1186/1471-2288-13-117>
 38. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77-101. <https://doi.org/10.1191/1478088706qp0630a>
 39. Eli K, Howell K, Fisher PA, Nowicka P. A question of balance: explaining differences between parental and grandparental perspectives on preschoolers' feeding and physical activity. *Soc Sci Med*. 2016;154:28-35. <https://doi.org/10.1016/j.socscimed.2016.02.030>
 40. Eli K, Hornell A, Etminan Malek M, Nowicka P. Water, juice, or soda? Mothers and grandmothers of preschoolers discuss the acceptability and accessibility of beverages. *Appetite*. 2017;112:133-142. <https://doi.org/10.1016/j.appet.2017.01.011>
 41. Neuman N, Eli K, Nowicka P. Feeding the extended family: gender, generation, and socioeconomic disadvantage in food provision to children. *FOOD Cult Soc*. 2019;22(1):45-62. <https://doi.org/10.1080/15528014.2018.1547066>
 42. Mena NZ, Gorman K, Dickin K, Greene G, Contextual TA. Cultural influences on parental feeding practices and involvement in child care centers among Hispanic parents. *Child Obes*. 2015;11(4):347-354. <https://doi.org/10.1089/chi.2014.0118>
 43. Lindsay AC, Sussner KM, Greaney ML, Peterson KE. Influence of social context on eating, physical activity, and sedentary behaviors of Latina mothers and their preschool-age children. *Health Educ Behav*. 2009;36(1):81-96. <https://doi.org/10.1177/1090198107308375>
 44. Yue A, Zhang N, Liu X, et al. Do infant feeding practices differ between grandmothers and mothers in rural China? Evidence from rural Shaanxi Province. *Fam Community Health*. 2018;41(4):233-243. <https://doi.org/10.1097/FCH.0000000000000198>
 45. Pankhurst M, Mehta K, Matwiejczyk L, et al. Treats are a tool of the trade: an exploration of food treats among grandparents who provide informal childcare. *Public Health Nutr*. 2019;22(14):2643-2652. <https://doi.org/10.1017/S1368980019000685>
 46. Rogers E, Bell L, Mehta K. Exploring the role of grandparents in the feeding of grandchildren aged 1-5 years. *J Nutr Educ Behav*. 2019;51(3):300-306. <https://doi.org/10.1016/j.jneb.2018.08.016>
 47. Jiang J, Rosenqvist U, Wang H, Greiner T, Lian G, Sarkadi A. Influence of grandparents on eating behaviors of young children in Chinese three-generation families. *Appetite*. 2007;48(3):377-383. <https://doi.org/10.1016/j.appet.2006.10.004>
 48. Speirs KE, Braun B, Zoumenou V, Anderson EA, Finkbeiner N. Grandmothers' involvement in preschool-aged Children's consumption of fruits and vegetables. *ICAN Infant, Child, Adolesc Nutr*. 2009;1(6):332-337. <https://doi.org/10.1177/1941406409349958>
 49. Vaughn AE, Ward DS, Fisher JO, et al. Fundamental constructs in food parenting practices: a content map to guide future research. *Nutr Rev*. 2016;74(2):98-117. <https://doi.org/10.1093/nutrit/nuv061>
 50. Dwyer J, Needham L, Simpson JR, Heeney ES. Parents report intra-personal, interpersonal, and environmental barriers to supporting healthy eating and physical activity among their preschoolers. *Appl Physiol Nutr Metab*. 2008;33(2):338-346. <https://doi.org/10.1139/H07-195>
 51. Toftemo I, Glavin K, Lagerlöv P. Parents' views and experiences when their preschool child is identified as overweight: a qualitative study in primary care. *Fam Pract*. 2013;30(6):719-723. <https://doi.org/10.1093/fampra/cmt056>
 52. Srivastava D, Torquati J, de Guzman MRT, Dev DA. Understanding parental ethnotheories and practices about healthy eating: exploring the developmental niche of preschoolers. *Am J Health Promot*. 2019;33(5):727-735. <https://doi.org/10.1177/0890117118810247>
 53. Watanabe E, Lee JS, Kawakubo K. Associations of maternal employment and three-generation families with pre-school children's overweight and obesity in Japan. *Int J Obes (Lond)*. 2011;35(7):945-952. <https://doi.org/10.1038/ijo.2011.82>
 54. Sata M, Yamagishi K, Sairenchi T, et al. Impact of caregiver type for 3-year-old children on subsequent between-meal eating habits and being overweight from childhood to adulthood: a 20-year follow-up of the Ibaraki Children's Cohort (IBACHIL) study. *J Epidemiol*. 2015;25(9):600-607. <https://doi.org/10.2188/jea.JE20140078>
 55. Kagamimori S, Yamagami T, Sokejima S, et al. The relationship between lifestyle, social characteristics and obesity in 3-year-old Japanese children. *Child Care Health Dev*. 1999;25(3):235-247.
 56. Metbulut AP, Ozmert EN, Teksam O, Yurdakok K. A comparison between the feeding practices of parents and grandparents. *Eur J Pediatr*. September 2018;177(12):1785-1794. <https://doi.org/10.1007/s00431-018-3244-5>
 57. Farrow C. A comparison between the feeding practices of parents and grandparents. *Eat Behav*. 2014;15(3):339-342. <https://doi.org/10.1016/j.eatbeh.2014.04.006>
 58. Lidgate ED, Li B, Lindenmeyer A. A qualitative insight into informal childcare and childhood obesity in children aged 0-5 years in the UK. *BMC Public Health*. 2018;18(1):1229. <https://doi.org/10.1186/s12889-018-6131-0>
 59. Chung A, Backholer K, Zorbas C, Hanna L, Peeters A. Factors influencing sweet drink consumption among preschool-age children: a qualitative analysis. *Heal Promot J Aust*. 2019. <https://doi.org/10.1002/hpja.306>
 60. Murakami K, Livingstone MBE. Associations between meal and snack frequency and diet quality and adiposity measures in British adults: findings from the national diet and nutrition survey. *Public Health Nutr*. 2016;19(9):1624-1634. <https://doi.org/10.1017/S1368980015002979>
 61. Yee AZH, Lwin MO, Ho SS. The influence of parental practices on child promotive and preventive food consumption behaviors: a systematic review and meta-analysis. *Int J Behav Nutr Phys Act*. 2017;14(1):47. <https://doi.org/10.1186/s12966-017-0501-3>
 62. Faith MS, Scanlon KS, Birch LL, Francis LA, Sherry B. Parent-child feeding strategies and their relationships to child eating and weight status. *Obes Res*. 2004;12(11):1711-1722. <https://doi.org/10.1038/oby.2004.212>
 63. Haycraft E, Karasouli E, Meyer C. Maternal feeding practices and children's eating behaviours: a comparison of mothers with healthy weight versus overweight/obesity. *Appetite*. 2017;116:395-400. <https://doi.org/10.1016/j.appet.2017.05.033>

64. Gu C, Warkentin S, Mais LA, Carnell S. Ethnic differences in parental feeding behaviors in UK parents of preschoolers. *Appetite*. 2017;113:398-404. <https://doi.org/10.1016/j.appet.2017.03.001>
65. de Lauzon-Guillain B, Musher-Eizenman D, Leporc E, Holub S, Charles MA. Parental feeding practices in the United States and in France: relationships with child's characteristics and parent's eating behavior. *J Am Diet Assoc*. 2009;109(6):1064-1069. <https://doi.org/10.1016/j.jada.2009.03.008>
66. Ogden J, Reynolds R, Smith A. Expanding the concept of parental control: a role for overt and covert control in children's snacking behaviour? *Appetite*. 2006;47(1):100-106. <https://doi.org/10.1016/j.appet.2006.03.330>
67. Boots SB, Tiggemann M, Corsini N. Pumpkin is "yucky"! a prospective study of overt and covert restriction in the development of young children's food preferences. *Appetite*. 2019;135:54-60. <https://doi.org/10.1016/j.appet.2018.12.035>
68. Daniels LA. Feeding practices and parenting: a pathway to child health and family happiness. *Ann Nutr Metab*. 2019;74(Suppl. 2):29-42. <https://doi.org/10.1159/000499145>
69. Llewellyn CH, Van Jaarsveld CHM, Johnson L, Carnell S, Wardle J. Nature and nurture in infant appetite: analysis of the Gemini twin birth cohort. *Am J Clin Nutr*. 2010;91(5):1172-1179. <https://doi.org/10.3945/ajcn.2009.28868>
70. Jansen E, Williams KE, Mallan KM, Nicholson JM, Daniels LA. Bidirectional associations between mothers' feeding practices and child eating behaviours. *Int J Behav Nutr Phys Act*. 2018;15(1):3. <https://doi.org/10.1186/s12966-018-0644-x>
71. Mallan KM, Jansen E, Harris H, Llewellyn C, Fildes A, Daniels LA. Feeding a fussy eater: examining longitudinal bidirectional relationships between child fussy eating and maternal feeding practices. *J Pediatr Psychol*. 2018;43(10):1138-1146. <https://doi.org/10.1093/jpepsy/jsy053>
72. Jansen PW, de Barse LM, Jaddoe VVW, Verhulst FC, Franco OH, Tiemeier H. Bi-directional associations between child fussy eating and parents' pressure to eat: who influences whom? *Physiol Behav*. 2017;176:101-106. <https://doi.org/10.1016/j.physbeh.2017.02.015>
73. Hennessy E, Hughes SO, Goldberg JP, Hyatt RR, Economos CD. Permissive parental feeding behavior is associated with an increase in intake of low-nutrient-dense foods among American children living in rural communities. *J Acad Nutr Diet*. 2012;112(1):142-148. <https://doi.org/10.1016/j.jada.2011.08.030>
74. Hughes SO, Shewchuk RM, Baskin ML, Nicklas TA, Qu H. Indulgent feeding style and children's weight status in preschool. *J Dev Behav Pediatr*. 2008;29(5):403-410. <https://doi.org/10.1097/DBP.0b013e318182a976>
75. Attar-Schwartz S, Buchanan A. Grandparenting and adolescent well-being: evidence from the UK and Israel. *Contemp Soc Sci*. 2018;13(2):219-231. <https://doi.org/10.1080/21582041.2018.1465200>
76. Griggs J, Tan J-P, Buchanan A, Attar-Schwartz S, Flouri E. 'They've always been there for me': grandparental involvement and child well-being. *Child Soc*. 2009;24(3):200-214. <https://doi.org/10.1111/j.1099-0860.2009.00215.x>
77. Wild LG. Grandparental involvement and south African adolescents' emotional and behavioural health: a summary of research findings. *Contemp Soc Sci*. 2018;13(2):232-245. <https://doi.org/10.1080/21582041.2017.1422536>

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

How to cite this article: Marr C, Reale S, Breeze P, Caton SJ. Grandparental dietary provision, feeding practices and feeding styles when caring for preschool-aged grandchildren: A systematic mixed methods review. *Obesity Reviews*. 2020; 1-16. <https://doi.org/10.1111/obr.13157>