The relation between family meals and health of infants and toddlers: A review

Chantal L. Verhage, Marleen Gillebaart, Shelley M.C. van der Veek, Carel M.J.L. Vereijken

Abstract

Family meals are associated with multiple health benefits in children and adolescents including evidence that eating together as a family may play a role in reducing childhood obesity. The current review aims to investigate whether the beneficial health effects of the family meal also apply to infants and toddlers.

PubMed, Web of Science, Scopus and PsycInfo were searched and 14 empirical studies were identified. The findings were discussed according to frequency of having a family meal and parental perception, associations between the family meal and health aspects (e.g., eating behaviors and diet quality) and causal influences of these associations.

Descriptive data showed that mothers offered food at a structured mealtime, but that eating together as a family was not always upheld. The frequency of family meals was positively associated with more nutrient-dense food intake and a more balanced diet. Different advantages (e.g., social importance, practical considerations) and obstacles (e.g., planning, possible mess) of the family meal were mentioned by parents. Further, having structured mealtimes and family meals was associated with more food enjoyment and less fussy and emotional eating. Finally, no causal studies were identified.

The limited number of studies suggests that the pattern of positive associations between family meal and child health which has been shown in older children may also exist in infants and toddlers.

More specific research is needed to examine the causality of the associations between family meal and health of the infant and toddler. The associations between the family meal and less fussiness and emotional eating, more food enjoyment and better nutrient intake suggest that the family meal is a valuable moment to promote healthy eating in toddlers and infants.

1. Introduction

According to the World Health Organization the estimated number of children under the age of five with overweight reached 42 million in 2015, which is six percent of all children worldwide (World Health Statistics, 2016). Over the past decade, accumulating studies have shown that frequently eating together as a family may play a role in reducing childhood obesity (e.g., Cook & Dunifon, 2012; Fulkerson, Larson, Horning, & Neumark-Sztainer, 2014; Gable, Chang, & Krull, 2007). For example, a meta-analysis demonstrated that children - between approximately three and 17 years - who shared a meal as a family three or more times a week, were at decreased odds for being overweight, and had healthier dietary and eating patterns (i.e., less disordered eating) (Hammons & Fiese, 2011). This suggests that family meals may play an important role in promoting healthy eating behavior in children. The current review aims to investigate whether family meals are associated with health benefits in infants and toddlers.

The family meal can be seen as a family ritual that is accompanied by different routines. Spagnola and Fiese (2007) suggested that “family routines and meaningful rituals provide both a predictable structure that guides behavior and an emotional climate that supports early development” (p.284). A significant number of articles varying in approach (e.g., longitudinal study, qualitative study, and meta-analysis) demonstrated that family meals are associated with numerous physical and mental health benefits in preschool and school-aged children (e.g., Fiese & Schwartz, 2008; Gable et al., 2007; Hammons & Fiese, 2011; Ochs & Shohet, 2006; Quick, Fiese, Anderson, Koester, & Marlin, 2011). Martin-Biggers et al. (2014) reviewed 81 studies (of which a small
number were longitudinal studies and the majorities were cross-sectional studies) on these associations in young children and adolescents (approximately from two to 18 years). More frequent family meals were associated with higher intake of healthy dietary components and nutrients (e.g., fruit and vegetables, iron, calcium) and lower energy intake (e.g., soft drinks). Furthermore, Martin-Biggers and colleagues indicated that children who had more frequent family meals had a healthier BMI, which may be related to factors such as parental control during mealtimes and a structured mealtome setting. The importance of the family meal may extend to other areas than nutrition and adiposity as well: in adolescence, sharing at least five family meals a week was associated with less substance abuse and higher scores on family support and self-esteem. Finally, some of the included studies also revealed positive associations between family meals and language and academic development, which may be due to family talk and debate during mealtome (Martin-Biggers et al., 2014).

Family meals may be an opportunity for parents to model healthy eating behavior. Palfreyman, Haycraft, and Meyer (2015) investigated the influence of modeling appropriate behavior during mealtimes. Results demonstrate that maternal modeling, both verbal (e.g., expressing likes/dislikes) and behavioral (e.g., eating certain items first), during mealtimes with children between zero and six years was related to less food responsiveness (e.g., eating too much or eating most of the time), less emotional over-eating and more food enjoyment. The American Psychological Association (2006) and American College of Pediatricians (2014) both acknowledge the importance of family meals for children’s nutritional health and consider it as a strategy to prevent childhood obesity. They suggest that the family meal is a good moment for adults to model appropriate behavior, as well as to intervene in inappropriate behavior, and concluded therefore that parents should be encouraged to plan family meals.

The review by Martin-Biggers et al. (2014) and the meta-analysis by Hammons and Fiese (2011) show that the majority of studies on the family meal has been conducted with children from the age of two years until adolescent age, resulting in a lack of knowledge on how family meals affect health and healthy eating behavior in infants and toddlers. Feeding can be seen as a developmental task which children have to successfully master in the first years of life. They have to progress from a restricted and guarded food environment in which milk is the sole source of nutrients to a varied and free food environment (Vereijken, Weenen, & Hetherington, 2011). It has also been shown that there are sensitive periods for food learning in the first years of life (Harris & Mason, 2017). The importance of this period in life for the development of healthy food preferences and eating habits is also supported by studies showing that early food patterns track to later eating patterns (Moore, Tapper, & Murphy, 2007; Nicklaus & Remy, 2013). Several studies have shown that individual preferences for food categories in the first three years of life predict individual preferences in four-eight year olds (Skinner, Carruth, Bounds, & Ziegler, 2002), as well as in adolescents (Nicklaus, Boggio, Chabanet, & Issanchou, 2004). Furthermore, healthy nutrition at a young age and good parental feeding practices have consequences for health and well-being later in life (e.g., healthy weight, better cognition) (Birch & Fisher, 1998; Pem, 2015; Walker et al., 2007). Thus, the first years of life seem especially important for the establishment of healthy food preferences and eating habits.

Therefore, the purpose of the present review is to fill the knowledge gap by investigating whether characteristics of the family meal are associated with outcomes in terms of health benefits in infants and toddlers (e.g., better nutrition quality and healthy eating behavior), and to gain more insight in the factors that are related to these potential outcomes.

Different aspects should be considered when defining the family meal. For example, the number of family members who are attending (e.g., are both parents present during the meal?), the setting in which the meal takes place (e.g., is the meal at the table or in front of television?), and also the types of meals that are served (e.g., healthy or unhealthy meals?) should be considered. Meiselman (2009) summarized different criteria which are often used in the literature when defining meals, namely: time of day, energy content, social interaction, food combinations, and a combination of all these criteria. Thus, the definition of a family meal depends on which criteria are prioritized, for example if social interaction is a preferred criterion of the meal, eating alone will not be defined as a meal. For the current review a definition of the family meal was used, inspired by the review of Martin-Biggers et al. (2014) and Meiselman (2009). Defining the family meal is complex for this age range as the child will pass through different stages regarding feeding (e.g., from breastfeeding to solid foods). Due to this, the definition has to be broad as eating together with an infant (e.g., focus on parent-child interaction and new food exposure) can be different from eating together with a toddler (e.g., focus lies more on toddler’s autonomy and in-depth mealtome interactions). The current review therefore uses the following definition: ‘The family meal can be seen as a social moment of the day during which food is eaten together with at least one family member.’

The current review intends to provide an overview of all relevant research regarding the family meal in infants and toddlers, in order to map the associations between family meals and health benefits for this age group. The review is guided by three aims. The first aim is to gather descriptive data and/or data on parental perceptions of the family meal with children between the ages of zero and three years. This includes for example how regularly parents are actually eating together with their young children, but also what obstacles or advantages parents perceive regarding the family meal as perceived benefits or barriers are important predictors of (health) behavior (Champion & Skinner, 2008, pp. 45–65). The second aim is to review the associations between family meals and health benefits in children aged zero to three years. In line with Martin-Biggers et al. (2014), it is expected that the family meal is associated with healthier food intake, better nutrition and familial relationships and less eating disorders in children aged zero to three years. Finally, the third aim is to review evidence for causality of these associations.

2. Methods

2.1. Literature search

The electronic databases PsycInfo, Scopus, PubMed and Web of Science were searched. No restrictions were made regarding publication year or language. Key search categories were family (i.e., family OR parental OR parents OR shared), meal (i.e., meal* OR dinner* OR breakfast* OR lunch* OR food OR eating OR supper OR table), and age (i.e., toddler* OR infancy OR baby OR young children OR “little children” OR “little child” OR infant* OR “early childhood” OR newborn* OR neonate* OR “small child*”). The search resulted in a total of 12,209 articles. The titles of the articles were screened by the first author based on the inclusion and exclusion criteria (listed in Table 1), which yielded 306 articles. The abstracts of these articles were screened by the first author for relevance and 85 articles were selected for full reading. Based on the full text and reference list searches (one extra article was included), 14 articles were selected by the first author. Finally, a quality assessment was conducted (more details in the ‘quality assessment’ section below) and all 14 articles were included. The article selection process is outlined in Fig. 1.

2.2. Quality assessment

To determine the quality of the selected articles the quality assessment tool of Moore (2012) was used. The tool can be used for qualitative and quantitative studies as it focuses on both methods. The quality assessment tool consists of 11 items (e.g., ‘How defensible is the design?’, ‘Is the context clearly described?’, ‘Are the findings
Inclusion and exclusion criteria.

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
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<tbody>
<tr>
<td>Empirical data</td>
<td>Review studies</td>
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<tr>
<td>Peer reviewed</td>
<td>Case studies</td>
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<td>Studies on eating together as a family (sharing meals)</td>
<td>Sample size under 10</td>
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<tr>
<td>Studies about activities during family mealtime (e.g., TV watching)</td>
<td>Parental disorders (e.g., depression or eating disorders)</td>
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<td>Studies on parental perceptions about family mealtimes</td>
<td>Children with disorders (e.g., autistic or medical conditions (e.g., cystic fibrosis)</td>
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<td>Family meal associated with health aspects (e.g., weight, dietary intake)</td>
<td>Focus on effects of general feeding styles that did not consider a family meal (e.g., emotional feeding)</td>
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<tr>
<td>Children under the age of three or with a mean age of three</td>
<td>Studies with the focus on children above three years</td>
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<td>Animal samples</td>
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<td>Breastfeeding studies</td>
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Fig. 1. Flow-Chart of the systematic article selection.

Table 1

Table 1: Inclusion and exclusion criteria.

convincing?"), which were rated with a score of 2 ("yes"), 1 ("partly") or 0 ("no"). The total quality score ranges from 0 to 22, with higher scores suggesting a higher quality. All articles were rated by the first author, while the other three authors each rated a different subset of papers that were randomly assigned. Any disagreement on total scores between the reviewers was resolved through consensus. All 14 articles were included.

3. Results

3.1. Synthesis of results

Due to heterogeneity of studies in terms of study design and outcome measures the results are summarized in a narrative form.

3.2. Description of different aspects investigated

The main aspects which were reported and which corresponded to the aims of the review are: 1) the frequency of family meals; how this differs per feeding approach chosen; parental perception, reported stressors and influences on having family meals; 2) associations between the family meal and nutritional quality and eating behavior; associations between parent-child mealtime interaction and nutritional intake; and 3) approaches to influencing parental attitude regarding the family meal, increasing communication during mealtime and the frequency of eating together. Table 2 presents an overview of the relevant aspects of the reviewed studies.

4. Summary of main findings

4.1. Frequency of having a family meal and parental perception about sharing meals

Six quantitative studies (Cameron et al., 2013; Chan et al., 2011; Fitzpatrick et al., 2007; Le Heuzey & Turberg-Romain, 2015; Le Heuzey et al., 2007; Morison et al., 2016) and three qualitative studies (Contreras & Horodynski, 2010; Horodynski et al., 2009; Spence et al., 2016) were found. Studies were conducted in France, New-Zealand, Australia and the United States (US) and had a mean quality score of 14 (range of scores 6–18).

Le Heuzey et al. (2007) showed in their French national survey which focused on feeding behavior and food consumption - among mothers (N = 713) of children younger than three years - that eating together regularly increases when the child gets older. At eight to 12 months 26% of the mothers reported that they ate regularly together with the child, which increased to 64% at 13 to 18 months. Moreover, 91% of the mothers reported eating regularly together with the child at the age of three years. Further, they showed that more than half of the mothers reported that their child ate the same as them at 13–18 months, which increased to 98% at the age of three. In a similar French national survey five years later Le Heuzey and Turberg-Romain (2015) showed that 24% of the mothers (N = 1188) reported eating regularly together at eight to 11 months, which increased to 51% at 12–17 months. Further, 92% reported eating regularly together at the age of three. Finally, almost half of the mothers reported that their child ate the same as the parents at 12–17 months, which increased to 93% at the age of three.

In their studies conducted in New-Zealand, Morison et al. (2016) and Cameron et al. (2013) showed (respectively, N = 26 and N = 199) that mothers of children aged between six to 12 months who were following baby-led weaning (i.e., infants are not spoon fed, but feed themselves pieces of food) ate significantly more family meals together (p's < 0.04) compared to mothers who fed their child with a spoon. This shows that the frequency of having family meals differs depending on the complementary feeding approach chosen by mothers.

Contreras and Horodynski (2010) showed that 40% of African-American mothers (N = 20) of children aged 15–36 months living in the US were assisted by an older sibling or spouse during mealtimes and that 65% indicated that somebody else fed their children sometimes. Furthermore, 40% of the mother reported that their child regularly ate meals in another room than the dining room and half of mothers reported having the television on during mealtimes. Another descriptive Australian study of the family meal is the study from Chan et al. (2011). They examined mothers (N = 740) of children aged 12–36 months about the use of certain feeding practices that were related to the family meal table (e.g., let the child eat with the rest of the family and let the child sit down during mealtime). Results showed that more than half of the mothers reported offering food at a structured mealtime and less than half reported eating the main meal with the rest of the family all of the time. Approximately one third of the mothers reported that their child ate the same food as the rest of the family all of the time and more than two third reported that their child sits down during a meal all of the time. In addition, 14% reported watching TV during mealtime often.

Another study showed that also ethnicity may play a role when it comes to having family meals. The study of Fitzpatrick et al. (2007) - conducted in the US - showed (N = 1336) that the number of nights the
<table>
<thead>
<tr>
<th>Authors and study objective(s)</th>
<th>Participants and sample</th>
<th>Design and methods</th>
<th>Relevant aspects of the family meal investigated</th>
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<tr>
<td><strong>Frequency and parental perceptions of family meals</strong></td>
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<tr>
<td>Le Heuzey, Turberg-Romain, and Lelievre (2007)</td>
<td>N = 713, mothers of children aged between zero and three years living in France.</td>
<td>Quantitative, Cross-sectional, national survey.</td>
<td>Frequency of: 1) eating together with the parents; 2) eating the same as the parents.</td>
<td>1) At eight-12 months, 26% of the mothers reported eating regularly together with the child; at 13-18 months of age 64% and at 31-36 months 91%. 2) At 13-18 months 53% of the mothers reported that their child regularly eats the same as them, this increased to 98% at 31-36 months.</td>
<td>9</td>
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<td>Le Heuzey and Turberg-Romain (2015)</td>
<td>N = 1188, mothers of children aged between zero and three years living in France.</td>
<td>Quantitative, Cross-sectional, national survey.</td>
<td>Frequency of: 1) eating together with the parents; 2) eating the same as the parents.</td>
<td>1) At eight –11 months 24% of the mothers reported eating regularly together with the child; at 12-17 months of age 51% and at 30-35 months 92%. 2) At 12-17 months 48% of the mothers reported that their child regularly eats the same as them, this increased to 93% at 30-35 months.</td>
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<td>Morison et al. (2016)</td>
<td>N = 26, mothers of infants between six and eight months living in New-Zealand.</td>
<td>Quantitative, Cross-sectional, dietary assessment.</td>
<td>Frequency of: 1) eating a meal with at least one adult; 2) eating the same ingredients as the family meal; 3) having the same meal preparation as the rest of the family according to the feeding method chosen.</td>
<td>1) Children of mothers following baby-led weaning (BLW: infants are not spoon fed, but feed themselves pieces of food) ate significantly more family lunches (p = .001) and evening meals (p = .02) together than mothers who followed traditional spoon feeding (TSF; mother feeds the child with a spoon). 2) Children of mothers following BLW ate significantly more of the same ingredients during lunch (p = .001) and evening meal (p = .001) as the rest of the family, compared to the TSF group. 3) Significantly more children of the mothers who followed BLW had the same meal preparation as the rest of the family for lunch (p &lt; .001) and evening meals (p &lt; .001) compared to TSF.</td>
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<thead>
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<tr>
<td>Cameron, Taylor, and Heath (2013)</td>
<td>Examines feeding practices and health-related behaviors in families following baby-led weaning or traditional spoon feeding methods to introduce complementary foods.</td>
<td>N = 740, (N = 374 valid returned questionnaires) mothers of children aged 12–36 months living in Australia.</td>
<td>Quantitative Cross-sectional, self-administered questionnaire.</td>
<td>Frequency of: 1) having a structured meal; 2) eating together with the family; 3) eating the same as the rest of the family; 4) sitting down during meal; 5) watching TV during mealtimes.</td>
<td>In total, 59% of the mothers reported offering food at a structured mealtime all of the time.</td>
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<td>Chan, Magarey, and Daniels (2011)</td>
<td>Explores feeding practices.</td>
<td>N = 27, African-American mothers of children aged 12–36 months living in the United States.</td>
<td>Qualitative Cross-sectional, focus group discussions.</td>
<td>1) Perceptions of mealtime environment; 2) activities during mealtime.</td>
<td>Half of the mothers had the television on and completed other tasks during mealtime. Meals took sometimes place in other rooms than the dining room/kitchen.</td>
<td>17</td>
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<tr>
<td>Horodynski, Brophy-Herb, Henry, Smith, and Weatherspoon (2009)</td>
<td>Studies maternal expectations and experiences with toddler feeding, mealtime environment and mealtime interactions.</td>
<td>N = 27, African-American mothers of children aged 12–36 months living in the United States.</td>
<td>Qualitative Cross-sectional, focus group discussions.</td>
<td>1) Identifying mealtime stressors while eating with the child, including elements of cultural context, parental and child characteristics, stressors; 2) coping behaviors.</td>
<td>Mealtime stressors reported by the mothers: a) child’s behavior (70%) (e.g., picky/obedient), b) throwing food/mess (all mothers) and c) mother’s own psychological state (a third of the mothers) (e.g., tired).</td>
<td>12</td>
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<tr>
<td>Contreras and Horodynski (2010)</td>
<td>Collects insights into how food choices and mealtime behaviors are affected by household stressors.</td>
<td>N = 20, African-American mothers of children aged 15–36 months living in the United States.</td>
<td>Qualitative Cross-sectional, focus group discussions.</td>
<td>1) Perceptions of child’s temperament, identification and appraisal of feeding challenges; and maternal psychological and physical states.</td>
<td>Mothers reported using different coping mechanisms, such as flexible family roles, familial support (40%) and indulgent feeding (60%).</td>
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<tr>
<td>Spence, Hesketh, Crawford, and Campbell (2016)</td>
<td>N=26, mothers of children aged two years living in Australia.</td>
<td>Qualitative Cross-sectional, telephone interviews (semi-structured).</td>
<td>Several influences on having family meals were mentioned by mothers:</td>
<td>Influences on eating with the child.</td>
<td>Part of the seven questions included: “Do you have any rules about food or meal times?”, “Are there any times when meals are more challenging and how do you respond?”, “Can you think of any reasons why you do those things?”</td>
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</tr>
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<td>Fitzpatrick, Edmunds, and Dennison (2007)</td>
<td>N = 1336, parents/guardians of children aged between one and 4.9 years (mean age of 2.8) living in the United States.</td>
<td>Quantitative Cross-sectional, survey.</td>
<td>Associations between the family meal and eating behavior and diet quality</td>
<td>The frequency of:</td>
<td>1) Number of days during the previous week that the family ate dinner together (never, sometimes (0–3 times a week), most (4–6 times per week) and daily).</td>
<td>11</td>
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<tr>
<td>Swanson et al. (2011)</td>
<td>N = 300, mothers of children aged two years living in Scotland.</td>
<td>Quantitative Cross-sectional, survey.</td>
<td>Investigates socio-cognitive predictors of maternal feeding behavior and their relationship with young children’s dietary quality.</td>
<td>Actual frequency of:</td>
<td>1) ‘Thinking about the last week, how often did (child) have a proper sit down meal?‘ (score range 0–7).</td>
<td>17</td>
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<tr>
<td>Jansen, Mallan, Nicholson, and Daniels (2014)</td>
<td>N=462, mothers of children aged 21-27 months living in Australia.</td>
<td>Quantitative Cross-sectional, The Feeding Practices and Structure Questionnaire (FPSQ).</td>
<td>Constructs and evaluates a questionnaire for assessing parental feeding practices that support healthy eating behavior.</td>
<td>1) “Family Meal Setting” construct includes eating meals with the family and eating the same food as the rest.</td>
<td>1) “My child eats main meals with the rest of the family”. “My child eats the same meals as the rest of the family”. “I cook separate meals for my child” (never, rarely, sometimes, often, always).</td>
<td>21</td>
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### Table 2 (continued)

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<thead>
<tr>
<th>Question asked and/or data collected related to the family meal</th>
<th>Food enjoyment (r = −0.29, p &lt; 0.001)</th>
<th>Emotional under-eating (r = −0.15, p &lt; 0.01)</th>
<th>Emotional over-eating (r = −0.13, p &lt; 0.01)</th>
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<tr>
<td>Mother’s presence and her emphasis during mealtimes</td>
<td>I sit down with my child at meals (never, rarely, sometimes, often, always)</td>
<td>I listen to my child at meals</td>
<td>I talk to my child at meals</td>
</tr>
<tr>
<td>Meal timing</td>
<td>How often mother accompanies the child and has complete attention for the child during mealtimes</td>
<td>My child and I face each other when eating</td>
<td>My child and I eat together</td>
</tr>
<tr>
<td>TV watching</td>
<td>How often the TV was on during mealtime</td>
<td>The TV is on during mealtimes in the same room we eat our meals in</td>
<td>My child watches TV during meals (never, rarely, sometimes, often, always)</td>
</tr>
<tr>
<td>Social interaction during mealtimes</td>
<td>How often are you firm about where your child should eat?</td>
<td>I allow my child to wander around during a meal</td>
<td>I insist my child eats meals at the table</td>
</tr>
<tr>
<td>Maternal responsiveness and slowness of eating</td>
<td>My child sits down when having meals (never, rarely, sometimes, often, always)</td>
<td>How often do my children eat their meals (never, rarely, sometimes, often, always)</td>
<td>How often do my children eat their meals (never, rarely, sometimes, often, always)</td>
</tr>
<tr>
<td>Construct includes sitting at the table</td>
<td>My child eats meals at the table</td>
<td>My child eats meals at the table</td>
<td>My child eats meals at the table</td>
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**Findings relevant to the family meal quality**

1. Eating more often in a family meal setting was significantly negatively correlated with fussiness (r = −0.40, p < 0.001), emotional under-eating (r = −0.15, p < 0.01), emotional over-eating (r = −0.13, p < 0.01), and positively correlated with satiety.

2. A more structured mealtime setting was significantly negatively associated with food enjoyment (r = 0.29, p < 0.001), associated with satiety.

3. Structured mealtime timing was significantly positively correlated with emotional under-eating (r = 0.16, p < 0.001), and emotional over-eating (r = 0.14, p < 0.01), and was positively correlated with food enjoyment (r = 0.25, p < 0.001).

**Relevant aspects of the family meal quality**

- In the United States, mealtime behaviors and social interaction during mealtimes with the toddlers significantly decreased the frequency of energy-dense food consumption (B = −0.063, p < 0.027). No significant effects were found for NHW toddlers.

- In the study by Weatherspoon, Venkatesh, Compares food patterns and mealtime behaviors and determines predictive factors of nutrient-dense and energy-dense food intake between two different ethnic groups.
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<tr>
<td>Black and Teti (1997)</td>
<td>N=59, adolescent African-American mothers of infants &lt; 13 months living in the United States.</td>
<td>Quantitative Experimental, RCT (lab observations), Parent Child Early Relational Assessment and a modification of the About Your Child's Eating Questionnaire.</td>
<td>1) Attitudes regarding family meals as a pleasant context and reciprocal mealtime communication.</td>
<td>1) &quot;Mealtimes are an important time for me to talk to my baby&quot;, &quot;I can tell when my baby dislikes something&quot;, &quot;I can tell when my baby is hungry&quot;, &quot;I can tell when my baby is full&quot;, &quot;I talk to my baby during mealtimes&quot;, &quot;My baby watches me during feeding&quot;, &quot;I feel tense during mealtimes&quot;, &quot;It's hard to figure out when my baby is hungry&quot;, &quot;Mealtime is tense&quot;, &quot;I feel frustrated by my baby's messiness during feeding&quot; (never, once in a while, sometimes, often, nearly every time).</td>
<td>1) Mothers in the intervention group (i.e., watching a feeding videotape) showed significantly more positive attitudes towards the family meal with ( p = .001 ), compared to the control group.</td>
<td>17</td>
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<tr>
<td>Willis, Roberts, Berry, Bryant, and Rudolf (2016)</td>
<td>N=624, parents of children with a median age of two years (41.3% &lt; 24months) living in the United Kingdom.</td>
<td>Quantitative Experimental (pre-posttest), Family Eating and Activity Habit Questionnaire.</td>
<td>1) Regularity of sitting down together for meals and having family meals; 2) watching TV during mealtime.</td>
<td>1) Reporting on sitting together for meals (answer scales not available). 2) Reporting on watching television during mealtimes (answer scales not available).</td>
<td>1) After following the HENRY program parents showed an increase in sitting down together for a meal (( p &lt; .001 )). 2) After following the HENRY program parents showed a reduction of having the TV on during mealtimes (( p &lt; .001 )) with their children.</td>
<td>14</td>
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family ate together varied by ethnicity, as Hispanic and non-Hispanic white mothers with children (with a mean age of 2.8 years) reported eating dinner together significantly more frequently than non-Hispanic blacks \( p < .05 \). In contrast, the number of nights the family ate together did not differ by parental education.

Horodynski et al. (2009) showed \( (N = 27) \) that some African-American mothers of children aged 12–36 months living in the US reported having uncomfortable feelings when allowing their toddler to feed themselves because of the potential mess. A third of the mothers said that their toddlers were seated during meals and several mothers admitted that they left the table because of their child’s picky eating. About half of the mothers had the TV on during meals and others described that they completed other tasks (e.g., washing or cleaning) while their toddler was eating, due to the toddler’s slow eating, being too talkative or because the toddlers were perceived as independent and able to eat alone. So, when mothers were at home, they did not always join their child during eating. Meals usually took place in the kitchen or dining room, but some toddlers ate in their bedrooms or elsewhere. Half of the mothers perceived the mealtime as an important moment to socialize or as a moment to feel connected to their child.

A previous mentioned similar study was conducted by Contreras and Horodynski (2010) \( (N = 20) \). They showed that 70% of the African-American mothers of children 15–36 months reported that their child’s behavior (e.g., stubborn, picky) was a predictor of stress when eating together. Further, all mothers in the focus groups reported the issue of toddlers throwing food, making a mess, fighting with siblings, refusing food and playing at the table. Mothers reported that they were physically tired of caretaking and that these feeding challenges were psychologically draining.

Finally, Spence et al. (2016) investigated what affects family meals according to mothers \( (N = 26) \) of two-year-olds living in Australia. Mothers perceived the ease and time-saving character of the family meal (e.g., only having to cook once for the whole family; \( N = 12 \)) and the importance of the social part of the meal (e.g., a moment to catch up; \( N = 13 \)) as benefits of having family meals. An important reported motivation for having family meals, was the support of the partner when it comes to having structured meal times and modeling healthy eating behavior \( (N = 9) \). Other reported motivations were the recommendations of health care professionals \( (N = 2) \), being exposed to feeding messages of eating together \( (N = 8) \) and one’s own upbringing \( (N = 19) \) (e.g., ‘We always used to have dinner when my dad and mum got home’). Furthermore, mothers reported that limited time and feelings of tiredness \( (N = 10) \) and working hours led to fewer family meals.

4.2. Short summary

In summary, results showed that almost all children have regular family meals at the age of three (Le Heuzey & Turberg-Romain, 2015; Le Heuzey et al., 2007). Furthermore, results showed that the frequency of having a family meal differs in relation to the complementary feeding approach (Cameron et al., 2013; Morison et al., 2016) and between families from different ethnic backgrounds (Fitzpatrick et al., 2007). Studies that focused on parental perceptions about eating together as a family in a low-income sample indicated different reported mealtime challenges, such as the mess during the meal and child’s behavior during mealtime. Further, these studies showed that meals did not always take place in the dining room (Contreras & Horodynski, 2010; Horodynski et al., 2009). The studies of Contreras and Horodynski (2010) and Spence et al. (2016) showed that reported feelings of being (physically and mentally) tired by mothers interfered with having family meals. Further, Contreras and Horodynski, Chan and colleagues (2011) and Horodynski and colleagues showed that the TV was often on during mealtimes. Two studies showed that half of the mothers perceived the mealtime as a valuable moment to socialize (Horodynski et al., 2009; Spence et al., 2016). Furthermore, Chan and colleagues showed in their study that less than half of the mothers reported eating together all of the time, which is in line with the study of Horodynski and colleagues in which half of the mothers reported leaving the table during mealtimes to do other tasks.

4.3. Associations between the family meal and eating behavior and diet quality

Four quantitative studies (Fitzpatrick et al., 2007; Jansen et al., 2014; Swanson et al., 2011; Weatherspoon, Venkatesh, Horodynski, Stommel & Brophy-Herb, 2013) were found. The studies were conducted in the US, Australia and Scotland and had a mean quality score of 17 (range of scores 11–21).

Fitzpatrick et al. (2007) and Swanson et al. (2011) examined the associations between family meal frequency and healthy food intake and dietary quality (respectively \( N = 1336 \) and \( N = 300 \)). Fitzpatrick and colleagues showed that the odds of serving fruits and vegetables significantly increased with each night the family ate dinner together (respectively \( p < .001 \), odds ratio = 1.14; \( p < .001 \), odds ratio = 1.15; controlled for parental race and education). Furthermore, the results showed that after controlling for parental race and education having the television on during dinner significantly decreased the odds of serving fruits \( (p < .05, \text{odds ratio} = 0.95) \) and vegetables \( (p < .01, \text{odds ratio} = 0.94) \). No significant effects were found on milk serving. Swanson and colleagues examined in Scotland whether family meals were related to a child’s dietary quality by dividing the two-year-old children in groups with better or poorer dietary quality based on the guidelines of the ‘Balance of Good Health’ (i.e. Food Standards Agency: The EatWell Plate). Feeding behavior was measured according to actual frequency (e.g., ‘Thinking about the past week, how often did your child have breakfast?’). Results showed that actual frequency of cooking from scratch was highly significantly correlated with having a family meal \( (r = 0.74, \ p < .0001) \) and that the actual frequency of having family meals was significantly greater for mothers of children with a better quality diet \( (p < .006) \). Thus, children with a better diet quality had significantly more family meals than children with a poorer diet quality.

Jansen et al. (2014) showed in their study among mothers \( (N = 462) \) of children aged 21–27 months living in Australia, that the construct Family Meal Setting (e.g.; ‘My child eats main meals with the rest of the family’, ‘My child eats the same meal as the rest of the family’, ‘I cook separate meals for my child’) was significantly correlated with four scales of the CEBQ (Child Eating Behavior Questionnaire; Wardle, Guthrie, Sanderson, & Rapoport, 2001). Eating more often together in a family meal setting was significantly negatively correlated with fussiness \( (r = -0.40, \ p < .001) \), emotional under-eating \( (r = -0.15, \ p < .01) \) and emotional over-eating \( (r = -0.13, \ p < .01) \), and a positive correlation was found with food enjoyment \( (r = 0.29, \ p < .001) \). The second construct Structured Meal Setting (e.g., ‘I insist my child eats meals at the table’) was significantly correlated with five scales of the CEBQ. A more structured meal setting was negatively correlated with the combined scale satiety responsiveness and slowness of eating \( (r = -0.16, \ p < .001) \), fussiness \( (r = -0.14, \ p < .01) \), emotional under-eating \( (r = -0.15, \ p < .01) \), and emotional over-eating \( (r = -0.14, \ p < .01) \), and a positive correlation was found with food enjoyment \( (r = 0.25, \ p < .001) \). The third construct Structured Meal Timing (e.g., ‘I decide the times when my child eats his/her meals’) was significantly positively correlated with one subscale of the CEBQ, namely with emotional under-eating \( (r = 0.09, \ p < .05) \).

Weatherspoon, Venkatesh, Horodynski, Stommel and Brophy-Herb (2013) compared food patterns and mealtime behaviors of African-American (AA) mothers and toddlers and non-Hispanic White (NHW) mothers and toddlers \( (N = 599) \) living in the US and investigated predictive factors of healthy food intake. Different mealtime behaviors were measured, for example mother’s supervision of the meal and toddler involvement during the meal. One of the behaviors that was measured and which fits in the family meal definition was mother’s
emphasis on social interactions during mealtimes (i.e., mother accompanies the child and has complete attention for the child during mealtimes) with their 12–36 months old children. Mother’s emphasis on social interaction during mealtimes was an important predictor of food intake as it was associated with less consumption of calorie/energy-dense food (e.g., sweetened foods, cookies) in toddlers ($B = -0.132$, $p = .001$) and higher consumption of nutrient-dense foods (e.g., vegetables, fruits, unsweetened cereals; with $B = 0.097$, $p = .046$) in both groups. So, mother’s company during the meal and interaction with the child during the meal was associated with lower energy-dense food consumption. Finally, the more often the TV was on during mealtimes the less frequent AA toddlers consumed nutrient-dense foods ($B = -0.063$, $p < .027$). This association was not found for NHW toddlers.

4.4. Short summary

In summary, the odds of serving fruit and vegetables was significantly correlated with the number of nights the family ate together (Fitzpatrick et al., 2007) and the frequency of family meals was associated with a better diet quality in children in low socioeconomic status (SES) groups (Swanson et al., 2011). Furthermore, having a family meal and eating in a structured setting was associated with less fussiness, satiety responsiveness and emotional eating and more food enjoyment (Jansen et al., 2014). Food enjoyment can be seen as beneficial for parents and children, because a child that enjoys his/her food will not be a difficult eater. However, extreme food enjoyment may also put a child at risk of eating too much; in that case it should obviously not be perceived as a health benefit. Fitzpatrick and colleagues and Weatherspoon et al. (2013) both showed that having the TV on during mealtimes is associated with lower intake of nutrient-dense foods in low SES groups. However in the study of Weatherspoon and colleagues this was only the case for African-American toddlers. Finally, mother’s presence during the meal and interaction between mother and toddler during the meal was associated with less energy-dense food intake.

4.5. Causal influences of family meals on child’s health

No studies were found which examined the causal effects of the family meal on health aspects of infants and toddlers. However, two studies were found that investigated the impact of.mother’s presence during the meal and interaction between mother and toddler during the meal was associated with less energy-dense food intake.

Finally, Willis et al. (2016) examined the impact of an eight week obesity intervention that provided parents ($N = 624$) of toddlers (median age of two years) living in the UK with information for a healthier family lifestyle. They investigated the regularity of having family meals before and after following the program. Results showed that after following the intervention, an increase in sitting down together for a meal ($p < .001$) and a reduction of having the TV on during mealtimes ($p < .001$) was reported. Interestingly, the authors also showed that after following the intervention parents ate significantly more home meals ($p < .001$) and both age-groups (i.e., parents and children) consumed significantly more fruit and vegetables ($p’s < 0.001$). Despite the fact that the intervention consisted of multiple elements, it may be assumed that an increase of family meals and homemade meals contributed to a positive increase of diet quality intake.

4.6. Short summary

In summary, no studies were found that investigated the causal effects of the family meal on child’s health. However, two intervention studies were found which showed that parental attitudes towards the family meal, communication during meals between parent and child and frequency of having family meals can positively be influenced (Black & Teti, 1997; Willis et al., 2016). Both studies investigated a low SES group.

5. Discussion

The findings of the present review showed that eating together as a family is associated with better nutrition, healthier food intake and fewer eating problems (e.g., fussiness and emotional eating) in infants and toddlers. These findings are in line with the review of Martin-Biggers et al. (2014), which focused on older children (from two to 18 years). The first aim of the review was to get an overview of descriptive data to gain understanding of what constitutes the family meal in families of children aged zero to three years, and how it is described and perceived by parents. Results showed that at the age of three years most children regularly had family meals (Le Huezey & Turberg-Romain, 2015; Le Huezey et al., 2007) and that the frequency of having family meals differs depending on the complementary feeding approach chosen by mothers (Cameron et al., 2015; Morison et al., 2016). Furthermore, findings showed that mothers perceive the family meal as a valuable moment and report practical benefits (e.g., having to cook once for the whole family) (Spence et al., 2016). However, despite the apparent advantages, actually eating together with the rest of the family all of the time does not always occur (Chan et al., 2011; Contreras & Horodynski, 2010; Horodynski et al., 2009). This may be due to different mealtime stressors mentioned by mothers, for example child’s behavior (e.g., picky or stubborn), possible mess and difficulty in planning the family meal (Contreras & Horodynski, 2010; Horodynski et al., 2009; Spence et al., 2016).

The second aim of the review was to investigate the associations between the family meal and health benefits in infants and toddlers. Although we aimed to review a broad range of child outcomes that might be associated with family meals, our review showed that the present literature only focuses on the relation between family meals and nutritional intake and eating behavior of the child. The included studies showed that the frequency of family meals, as well as a structured meal environment and mother’s presence and emphasis on interactions during mealtimes were associated with serving more nutrient-dense foods (e.g., fruit and vegetables), with less energy-dense food intake (e.g., sweetened food) (Fitzpatrick et al., 2007; Weatherspoon et al., 2013) and having a more balanced diet according to the United Kingdom guidelines (i.e. Food Standards Agency: The EatWell Plate) (Swanson et al., 2011).

Further, current findings showed associations in the expected directions for this young age group between family meals and less fussiness and emotional eating and more food enjoyment (Jansen et al., 2014). In addition, an association was found between having a more structured meal setting and less satiety responsiveness and slowness of eating (Jansen et al., 2014). Having clear rules, such as in a structured meal setting, would be expected to lead to positive feeding behavior.
and better satiety responsiveness. So, finding the opposite may be surprising. However, Jansen and colleagues suggest that parents may perceive satiety responsiveness and slowness of eating as signs that their child is not eating enough and may be a difficult eater. If satiety responsiveness and slowness of eating are interpreted in that way, a structured meal setting may relate to less perceived problematic child eating behavior. In contrast to the review by Martin-Biggers et al. (2014), we found no studies investigating the relations between family meals and broader outcomes of child health and well-being, such as socio-emotional or cognitive development. As these relations have been found in later childhood and adolescence, future studies are encouraged to take a broader perspective on the potential beneficial role of family meals on the development of infants and toddlers.

The third aim was to review evidence for causality of the identified associations. Unfortunately, no studies were found that examined the causal effects of the family meal on the health benefits for infants and toddlers. However, two experimental studies were found that were focused on changing parental attitudes towards eating together. More parent-child interaction during mealtime and frequency of eating together led to significant positive changes in maternal communication during mealtimes, frequency of having family meals and maternal attitudes regarding family meals after following an intervention (Black & Teti, 1997; Willis et al., 2016).

The present review is in line with the findings of Martin-Biggers et al. (2014). However, as only associations have been studied, it is not clear through what mechanisms the characteristics of the family meal are related to the various outcomes. Also, the reviewed studies focused mainly on the frequency of eating together (Fitzpatrick et al., 2007; Hammons & Fiese, 2011; Martin-Biggers et al., 2014; Swanson et al., 2011) and less on other relevant characteristics of the family meal. Future studies should consider a wider range of characteristics of the family meal and should investigate how they relate to various outcomes and what the mechanisms are. It is currently not possible to provide a full overview. However, Fig. 2 attempts to organize possible factors and suggestions on how these factors may be related to each other to describe the effects of the family meal. The first box includes influences on family meal characteristics. The second box includes the characteristics of the family meal itself. The third box includes various ways in which children can learn during the family meal and through which the characteristics of the family meal can influence outcomes. A review by Mura Paroche, Caton, Vereijken, Weenen, and Houston-Price (2017) showed that young children learn about food through four different learning mechanisms. These mechanisms are influenced by the family situation and by parenting style. For example, observing parental eating behavior during mealtimes may directly and also in the longer term affect the child’s eating behavior. The listed mechanisms can play a role during the meal but also outside it. For example, children can be exposed to vegetables during a meal but also outside meals when they see them being prepared in the kitchen. Finally, the fourth box includes the possible effects of the family meal. According to the literature on parenting style, an authoritative parenting style (i.e., high in responsiveness and demandingsness) is related to better eating behavior in children (Luther, 2007). Authoritative parents are highly sensitive to their child’s ability to respond to their expectations (Luther, 2007) and may serve as worthy role models for their children (e.g., having structured mealtimes, emphasizing social interaction during meals). Parenting style plays a role in mealtime rules and eating atmosphere and in turn influences the degree to which the child learns during mealtime. Thus, to exemplify Fig. 2, parenting style (box 1) influences the interaction at the family meal (box 2) and through modeling (box 3) results in better eating behavior (box 4). Fig. 2 may give direction to future studies to investigate which factors play a role during family meals. Once the family meal is better understood, the different factors and mechanisms can be supported to positively influence child health.

The current review has some limitations that should be taken into account when interpreting the results. First, two included studies (Le Heuzey & Turberg-Romain, 2015; Le Heuzey et al., 2007) had a low quality assessment score of 9 and 6 out of 22. Nevertheless, the studies included relevant descriptive data. Due to the large variety of study designs it was difficult to compare the quality of the studies and it was therefore concluded that it is not possible to exclude articles based only on the quality score. Second, all included studies were conducted in western countries and were mainly focused on eating together with a family member. However, it should be taken into account that this may not be the same in other societies and cultures. For example, in China there is a tendency for age groups to eat together rather than with the family members (Ochs & Shohet, 2006). Future studies should investigate whether the positive associations that were found are also present in these societies and in societies in which it is common to have meals with important others besides the family. Third, it should be noted that most of the included studies did not adjust for possible confounders. Future studies should take possible confounders such as socioeconomic status into account as this may impact the likelihood of family meals and child’s well-being. Fourth, another limitation of the review is the lack of experimental data and longitudinal data which make it impossible to draw results on causality. Miller, Waldfogel, and Han (2012) found in their study, after controlling for multiple confounders, no significant associations between the frequency of family meals and behavioral outcomes in children five to 15 years of age. For the age group discussed in this review it is easy to imagine how the family meal can have different effects depending on meal characteristics and the mechanisms at work. For example, if the parents have an unhealthy eating pattern then modeling may lead to unhealthy eating habits and nutritional intake while the opposite would be the case when the parents show healthy eating behavior. Furthermore, children in the first years of life have slightly different nutritional needs from adults. In such a case modeling and exposure may lead to a nutritional pattern which may be optimal for adults but which is suboptimal for children. To untangle such effects of the family meal it is necessary to conduct longitudinal and experimental studies which include all relevant

![Fig. 2.](Guttman & Greenbaum, 1998) to describe the potential factors involved in the family meal.
Factors. Fifth, as a standardized definition of family meals is lacking there was a lot of variability in how family meals were operationalized in the included articles. The current review was the first to propose a definition that can be used in general to define the family meal for this young age. Future studies may further build on this definition to reach consensus on what defines the family meal.

Finally, an important strength of the review is that parents from different social economic groups (i.e., high and low) were investigated. Respondents from low SES groups were investigated in half of the included studies, both qualitative (Contreras & Horodynski, 2010; Horodynski et al., 2009) and quantitative (Black & Teti, 1997; Fitzpatrick et al., 2007; Swanson et al., 2011; Weatherspoon et al., 2013; Willis et al., 2016). However, no comparisons were made in the included studies between high and low SES groups and family meals. More research is needed that focusing on the influence of SES on having family meals.

6. Conclusion

In conclusion, this review suggests that the pattern of positive associations between family meals and health benefits in children, which has been shown in older age groups, may also exist in infants and toddlers. In addition, the current review revealed that sharing meals as a family is associated with more nutrient-dense food intake, less fussy eating, and more food enjoyment. Mothers do perceive the family meal as a valuable moment; however various reported obstacles may lead to fewer family meals. The family meal can be seen as a platform for child development related to healthy eating behavior. Future research should focus on the causal directions of these positive associations and examine how the different proposed factors that are involved in the family meal, are related. Based on this knowledge, we can support parents in having family meals and make them aware of this valuable moment to stimulate healthy eating in their infants and toddlers.

Conflicts of interest

C.L. Verhage and C.M.J.L. Vereijken are employees of Danone Nutricia Research.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.appet.2018.04.010.

References


