

Introducing complementary foods to infants: Does age really matter?
A look at feeding practices in two European communities: British and Italian
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Abstract

Advice about the age for introducing complementary food to infants varies across European countries. Little is known about the actual practice of complementary feeding (CF) in the face of different advice from health professionals within Europe, nor about the impact of different ages of onset of CF on infant food acceptance. This longitudinal study aimed to explore CF in two European communities, British and Italian and to investigate whether infant age of CF influenced infant food acceptance. Forty-six mothers were interviewed before the onset of CF (Visit 1), one week after CF (Visit 2), and at 7 months of infant age (Visit 3), and infant mealtimes were video-recorded at Visits 2 and 3. CF occurred in both groups at a similar range of ages. CF age did not affect infant food acceptance at either Visits. Advice on CF should be based on cultural and individual differences.

Keywords: infant feeding, complementary food, feeding methods, food acceptance.

Introduction

Complementary feeding (CF) is defined as the process starting when breast milk is no longer sufficient to meet the nutritional requirements of the infant (Dewey, 2001; Elsom, Fleischer, Michaelsen, & Weaver, 2000). Complementary foods, given in addition to infant milk, are therefore necessary to fill the gap in energy and iron and other essential nutrients (European Food Safety Authority [EFSA], 2009); breastfeeding along with appropriate complementary foods should continue up to two years of age or beyond (World Health Organisation [WHO], 2016).

Eating habits and attitudes towards eating can be considered one of the most important aspects of a culture. Furthermore, feeding methods and times of eating are culturally variable (Slome, 1960). Because of different cultural traditions, attitudes, and systems (Wright, Nancarrow, & Kwok, 2001), the reasons for introducing complementary food may vary widely. The literature shows large differences in practice across the world in the timing of the onset of CF, and even within European cultures, CF practices are surprisingly varied (see Table 1).

TABLE 1 ABOUT HERE

Although the studies reported in Table 1 show that the timing of CF varies worldwide, many of these studies pre-date the new recommendations by the WHO in 2001, which have been changed from between 4-6 months (WHO, 1989) to around 6 months. Today there is strong pressure from health policy makers for mothers to solely breastfeed until 6 months, not to introduce complementary food until that age and even to continue breastfeeding up to 2 years (WHO, 2014).

In 2003, the Department of Health (DoH) in the UK, adopted the WHO recommendations (Scientific Advisory Committee on Nutrition [SACN], 2003), advising the onset of CF at around 6 months (DoH, 2009). Nonetheless, despite this advice, some experts recommend

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starting earlier than 6 months. The European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) for instance, recommends the introduction of complementary foods between 17 and 26 weeks (Agostoni et al., 2008). In Italy, the Ministry of Health (Ministero della salute, 2010) affirms that in some cases, if infants are formula fed, CF can start between 4 and 6 months, otherwise at around 6 months. Also, the EFSA (2009) argues that it is not possible to have a fixed starting age recommendation (provided it is not earlier than 4 months), warning that “breast milk may not provide sufficient iron and zinc for some infants between the age of 4 and 6 months, and these infants will require complementary foods” (p. 2). In Italy, it is recommended that the starting age should be discussed with the paediatrician (EFSA, 2009), who is the only professional responsible for the infant health; the role of health visitor, for instance, does not exist. Across European countries, the advice regarding the introduction of complementary food varies broadly (see Table 2).

TABLE 2 ABOUT HERE

Within European countries there are also differences regarding the methods of introducing complementary foods to infants. In the UK for example, baby-led weaning (BLW) has recently become very popular (Brown & Lee, 2010). This method consists of allowing the infant to feed herself finger foods from the very beginning of CF; mothers do not need to spoon feed their infant (see Rapley & Murkett, 2008). On the other hand, spoon feeding (SF) consists of offering the infant the food using a spoon, and waiting for the infant to open the mouth after putting a little amount of food on the infant’s lips (Satter, 2000). This method is the most well-known method of feeding generally used in Western countries (Satter, 2000). However, although mothers can choose between two methods of CF, particularly in the UK where BLW is now in vogue (Brown & Lee, 2010; Reeves, 2008) the advice regarding the age at which complementary food is introduced to infants does not change. Indeed, the

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National Health Service (NHS) in the UK recommends not starting complementary food before 6 months and uses the United Nations International Children's Emergency Fund (UNICEF) guidelines to advise mothers about infant signs of readiness: (i) infants should be able to "Stay in a sitting position and be able to hold their head steady", (ii) "Co-ordinate eyes, hands and mouth so that they can look at the food, pick it up, and put in their mouth all by themselves", (iii) "Swallow the food. Infants who are not ready will push the food back out so they get more around their face than in the mouths" (DoH, UK, & UNICEF, 2011, p. 6). In contrast, according to the Ministry of Health in Italy (Ministero della salute, 2010), mothers are advised to introduce complementary foods on the basis of infant preferences and family cultural environment.

Recent studies have shown that in the UK, BLW infants begin CF at around the recommended age, 6 months according to the DoH (2009), whereas SF infants are introduced to CF at an earlier age (Brown & Lee, 2010). Research has further shown that breast-fed infants are introduced to complementary foods later than formula-fed infants; on the contrary, infants with a lower birth weight are introduced earlier than infants with a higher birth weight (Caton et al., 2011). Additionally, it has been found that BLW infants have a lower Body Mass Index (BMI) in comparison with SF infants (Townsend & Pitchford, 2012). In Townsend and Pitchford's study (2012) BLW infants were younger than SF infants, which may indicate a relationship between infant age and BMI. Additionally, Sloan, Gildea, Stewart, Sneddon and Iwaniec (2008) found that at 7 months of age, infants who were introduced to complementary foods at an early age were heavier than those who began CF later, suggesting a link between early CF and infant weight in the second semester of life.

There are contradictory arguments regarding the benefits of introducing complementary foods at an early or late age. For instance, if the introduction of complementary foods is too early it might increase the risk of allergies and infections (DoH, UK, 2008; Fiocchi, Assa'ad,

& Bahana, 2006). On the other hand, late introduction of complementary foods, especially of lumpy food, may lead to later infant feeding problems and to reduced participation in varied family foods (Northstone, Emmett, Nethersole, & ALSPAC Study Team, 2001). Indeed, some experts suggest that problems of food acceptance may be more frequent when the introduction of complementary foods is delayed till after 6 months (Coulthard, Harris, & Emmett, 2009; Harris, 1993). Furthermore, it has been suggested that infant acceptance of new tastes and textures develop during the so called “sensitive period”, specifically during early infant life (Harris, 1993, 2000; Harris & Mason, 2017). This period corresponds to a time frame which may influence the development of later food acceptance and preferences (Hetherington, Cecil, Jackson, & Schwartz 2011); in this period infants are ready to learn to like different tastes (Harris, 2000). Bitter tastes, for example, are very important in the later acceptance of vegetables and highly related to food preferences and health outcomes in childhood (Fewtrell, Wilson, Booth, & Lucas, 2011). Indeed, infants who are offered a greater range of tastes before 6 months consume a greater variety of fruit and vegetables in childhood (Coulthard, Harris, & Fogel, 2014; Skinner, Carruth, Bounds, Ziegler, & Reidy, 2002). According to Harris and Mason (2017) an early introduction of tastes and textures is essential for a better food acceptance; on the contrary, a late introduction of textured foods (i.e., after 6 months of infant age) may lead to poorer food acceptance and feeding difficulties (Coulthard, Harris, & Emmett, 2009; Harris, 1993; Harris & Mason, 2017; Illingworth & Lister, 1964).

The decision about when to introduce complementary foods could therefore be quite crucial to maternal feeding practices and indeed, to the process of feeding itself. Delaying CF too long or starting CF too early because of medical or other advice could lead to difficulties in the feeding process both for the infant and for the mother. For instance, infant food refusal may result in mothers force-feeding their infants out of concern (Kreisler, 2012) or unwittingly revealing their concerns and negative feelings during feeding (Farrow & Blisset,

2006). At an extreme, conflicts between mother and infant over autonomy and control could lead to failure to thrive (Chatoor et al., 1997; Kreisler, 2012). Thus, it is clear that maternal feeding practices may have an impact on infant well-being and on the success of feeding.

Advice about the ‘right’ age to introduce complementary food to infants is notoriously varied. Little is known, however, about the extent to which advice is actually followed and about the effects of introducing complementary foods to infants at different ages on the success of the feeding process or on infant food acceptance.

Aims of the study

Given the wide range of advice about the introduction of complementary foods and the lack of clear evidence about actual practice or effects of different ages of onset of CF, the present study aimed to investigate differences in the advice mothers receive from health professionals in the UK (health visitors) and in Italy (paediatricians), and to examine the extent to which this advice is actually followed. The study further sought to explore infant food acceptance as well as infant birth weight, BMI *z*-scores, exclusive breastfeeding in relation to age of onset of CF. One of the aims of this study was to look at differences between BLW and SF infants, with particular regard to age of onset of CF. Finally, this study aimed to investigate infant food acceptance in relation to infant age of onset of CF.

We investigated these questions in two European communities with very different attitudes and habits regarding food and eating habits (Rozin, Fischler, Shields, & Masson, 2006) as well as different health systems (NHS, 2016): Italy and the UK. We further looked at the effects of age of onset of CF on willingness to eat as it has been suggested that early onset of CF may lead to better subsequent food acceptance (Coulthard et al., 2014; Coulthard et al., 2016; Harris, 2000).

We specifically hypothesised that:

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- (i) There would be a difference in advice given by health professionals with regard to infant age at the onset of CF (at 6 months in the UK and between 4 and 6 months in Italy) and current maternal feeding practices (closer to 6 months in the UK, and between 4 and 6 months in Italy).
- (ii) There would be a difference in infant age at the onset of CF according to infant birth weight and infant BMI at the onset of CF and at 7 months of age (lighter infants would be introduced to CF earlier than heavier infants; infants introduced to complementary foods at an early age would have higher BMI scores than those introduced later) as well as exclusive breastfeeding (breast-fed infants would be introduced to CF at a later age than non-exclusive breast-fed infants).
- (iii) There would be a difference in infant age at the onset of CF according to feeding method (i.e., SF, BLW) chosen by mothers (BLW infants would be introduced to CF later than SF infants).
- (iv) There would be a difference in infant food acceptance according to infant age at the onset of CF (infants introduced to CF at an earlier age would eat food more willingly and accept different food textures than infants introduced at a later age).

Method

Design

This longitudinal study was part of a larger investigation, which involved British and Italian mothers and their infants between the ages of 14 and 31 weeks. Each participating mother-infant dyad was visited at home on three occasions: Visit 1 took place before the introduction of complementary food (at 3 to 4 months of infant age), Visit 2 took place one week after the introduction of complementary food, and Visit 3 took place when the infant was 7 months old. Interviews at Visits 1, 2 and 3, and mealtimes at Visits 2 and 3 were video-

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recorded. Ethical approval was obtained from the Research Ethics Committee of the University of Portsmouth, UK.

Participants

Forty-six European mothers (23 British and 23 Italian) were recruited through advertisements in health centres, mothers' groups and local universities. Thirty-eight infants were fed using the "classic" method of introducing pureed or mashed food offered using a spoon, 8 infants (7 in the British sample and 1 in the Italian sample) were fed using the BLW method. The majority (98%) of the mothers were married or in a de facto relationship. Most of the mothers (96%) had obtained a Higher Education Degree. Mothers ranged in age from 21 to 41 years at Visit 1, with no group differences in maternal age; indeed, the two European groups were well matched (see Table 3). Table 3 shows participants' characteristics.

TABLE 3 ABOUT HERE

Procedure

Interviews took place in the family house or, when it was not possible, by phone or Skype (8 Italian mothers were interviewed once by phone or Skype, one Italian mother was interviewed twice on Skype). All videos of mealtimes were video-recorded at the family house. At Visit 1 mothers completed an Informed Consent Form and a demographic questionnaire including questions about mothers' age, nationality and education, number of children in the family, infant birth order, and the infant's weight at birth. At each visit the weight and the length of the infants were recorded in Kilograms (kg) using the "First Years Baby Scale" and the length was measured in centimetres (cm) using the "Seca baby mat" allowing the calculation $[\text{weight}/(\text{length})^2]$ of the infant's BMI, which was further converted to z-scores.

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Interviews

At Visits 2 and 3 maternal interviews were conducted before or after the video-taping of the mealtime at a time convenient to the mother and dependent upon the emotional state of the infant. The interviews were semi-structured with open-ended questions. The interview protocol was written in English first and then translated into Italian and back-translated into English for accuracy. Mothers were asked about any current infant health problems, any advice they had received about the introduction of complementary food from various sources, such as health professionals, family and friends, internet, and antenatal classes. Questions also concerned their story of feeding, from breast/formula feeding until the onset of CF, and maternal perceptions of infants' hunger and interest in food. Mothers were also asked to indicate types of textures they had offered to their infant after both Visit 2 and Visit 3 (see Table 4 for description of food textures). Questions were open ended with no response alternatives given and all responses were recorded with a camera or with a digital voice recorder when interviews were conducted over the phone. Objective information about age of onset of CF, advice received about when to introduce complementary food from health professionals, family and friends, reasons for introducing complementary foods to infants, and textures of foods was extracted from the interviews video-recorded during Visits 1, 2 and 3.

TABLE 4 ABOUT HERE

Video-taped mealtimes

Mealtimes were video-taped with the camera placed laterally, capturing both mother and infant, but affording a fuller view of the infant's face. Recording began before the mother finished preparing the food and finished after the mother signalled the end of the meal by lifting the infant out of the highchair or other seat. The camera was on a tripod with the camera person usually standing behind the camera. Infants had already become accustomed to

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the camera person, who had spent some time with both mother and infant prior to Visit 1. During the video-recording mothers and infants rarely looked at the camera.

Coding infant willingness to eat

A coder blind to the rationale of the study and to infant age of onset of CF was trained to code infant eating in the first 5 minutes of CF at Visits 2 and 3. Because duration of meals varied between infants (Visit 2: $M = 13.2$, $SD = 7.8$; Visit 3: $M = 14.5$, $SD = 7.7$) only the first 5 minutes of feeding were coded. Infant willingness to eat was coded by counting the number of spoonfuls: (i) willingly eaten (the infant opens the mouth when the food is coming and does not turn the head or close the mouth to avoid the spoonful), (ii) reluctantly eaten (the infant does not open the mouth spontaneously and/or turns the head to avoid the spoonful), (iii) refused (the infant closes the mouth and keeps it close until the mother retracts the spoonful). Due to the differences in maternal style of feeding only the spoonfuls which were direct to the infant's mouth, without any interruption, were counted (spoonfuls such as cleaning the infant's mouth and offering the remains again, and spoonfuls which were interrupted by external events, were not counted). For the purpose of this study only food willingly accepted (i.e., spoonfuls willingly eaten by infants) was taken into account. Eight mother-infant dyads were excluded from the analyses, as mothers followed the BLW method (the philosophy of this method is to let the infants feed themselves - mothers offer finger foods of different textures starting at around 6 months of infant age) (see Rapley & Murkett, 2008), rather than the 'classic' method of introducing pureed or mashed food offered using a spoon. A second observer blind to the interests of the study coded infant eating on 20% of the data at Visits 2 and 3. Reliability of coding using Cohen's kappa was between .8 and .9.

Data strategy and analysis

Part One of the data analysis focuses on advice given by health professionals as well as actual CF practices in the UK and Italy (Hypothesis i). *T* tests were used to look at differences between the two European communities (British and Italian), with CF infant age (advised and actual) as the dependent variable. Chi square tests were also computed to look at associations between advice received from other sources (e.g., family and friends) and nationality.

Part Two of the data analysis focuses on infant birth weight, infant BMI *z*-scores, exclusive breast feeding, and CF methods, with particular regard to infant age at the onset of CF (Hypotheses ii and iii). The overall sample ($N = 46$) was divided using a median split (with the division point at 21 weeks) on the age of onset of CF, to yield two groups: Early onset of CF and Late onset of CF. *T* tests were used to look at differences between Early onset and Late onset of CF, with infant birth weight and infant BMI *z*-scores as the dependent variables.

T tests were also computed to examine differences between Exclusive breastfeeding and Non-exclusive breastfeeding, with infant age of onset of CF (in weeks) as the dependent variable. Similarly, *t* tests were computed to look at differences between CF methods (BLW VS SF), with infant age of onset of CF (in weeks) as the dependent variable.

Finally, Part Three of the data analysis focuses on food eaten by infants (Hypothesis iv). *T* tests were conducted on the number of spoonfuls willingly accepted at Visit 2 and Visit 3, with age of the onset of CF (Early VS Late) as the independent variable (BLW infants were excluded from the analyses).

Chi square tests were performed to examine associations between age of onset of CF (Early VS Late) and textures of food eaten by infants (Texture eaten VS Texture non-eaten) at both Visits (BLW infants were included in the analyses).

Finally, *t* tests and Chi square tests were computed to examine differences in participants' characteristics between the two European groups (see Table 3).

For all statistical analyses, SPSS (v. 22, 2013, USA) was used.

Results

Age of onset of CF: Advice received and actual practice

Ninety-six percent of the mothers had received information from health professionals about when to introduce complementary food to infants. Before the onset of CF, most of the British mothers (91%) were advised by health visitors, and all the Italian mothers were advised by paediatricians. Most of the mothers (83%) stated they had received sufficient information from the health professionals. Advice from health professionals about the age of onset of CF differed significantly between Portsmouth and Rome ($t(22) = 4.8, p < .001$), with health visitors in Portsmouth all recommending starting at 6 months, while paediatricians in Rome suggested a range of ages between 4 and 6 months ($M = 5.1$ months, $SD = .9$ months). Interestingly, of the mothers in Italy who were exclusively breastfeeding only a minority (15%) were advised to start CF at 4 months, while the majority (54%) were advised to start at 6 months; of the mothers who were formula feeding the reverse was true, with half (50%) advised to start at 4 months, and a minority (30%) advised to start at 6 months.

Seventy-six percent of the mothers also received advice from other sources, such as the internet, grandparents, friends, and books and leaflets. As Table 5 shows, more British mothers (44%) used the internet as a source of information than did Italian mothers (17%).

TABLE 5 ABOUT HERE

Despite the difference in advice received by the mothers in the two European countries, the distribution of age of onset of CF was remarkably similar (see Figures 1 and 2). Most of the mothers introduced complementary food before the infants were 6 months ($M = 21.0$ weeks, $SD = 2.8$ weeks, ranging from 16 to 28 weeks) with a mean age in Portsmouth of 21.4 weeks ($SD = 2.8$ weeks, ranging from 16 to 28 weeks), and a mean age in Rome of 20.7 weeks ($SD = 2.8$ weeks, ranging from 16 to 26 weeks) ($t(44) = .9, p = .8$).

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In Portsmouth only 17% of the mothers followed the health visitors' advice about the introduction of complementary foods at 6 months; 65% of the mothers said they introduced complementary food earlier because they felt infants were ready to eat and 13% because of infant sleeping difficulties. In contrast, 70% of the mothers in Rome followed the paediatricians' advice. Only 22% of the mothers in Rome reported using their own judgement about the infants' readiness for eating and 8% introduced complementary food because they were due to end their maternity leave.

FIGURES 1 AND 2 ABOUT HERE

Age of onset of CF: Infant birth weight, BMI z-scores, exclusive breast feeding, and CF methods

T tests showed a significant effect for infant birth weight ($t(44) = 2.4, p = .02$); infants who were introduced at an Early age were significantly lighter at birth ($M = 3.4$ kg, $SD = .5$ kg) than infants who were introduced later ($M = 3.7$ kg, $SD = .4$ kg).

However, there were no differences between Early and Late onset of CF in infant BMI z-scores at either Visits (Visit2: $t(44) = -.7, p = .5$; Visit 3: $t(44) = -.4, p = .7$), nor there were effects of exclusive breastfeeding on infant age at the onset of CF ($t(44) = .4, p = .7$).

The onset of CF in BLW infants occurred later ($M = 23.0$ weeks, $SD = 3.3$ weeks, ranging from 17 to 28 weeks) than in SF infants ($M = 20.7$ weeks, $SD = 2.5$ weeks, ranging from 16 to 26 weeks) ($t(44) = 2.3, p = .03$).

Infant food acceptance

T tests revealed no main effects for Age of onset of CF on food willingly accepted by infants at either Visits (Visit 2: $t(36) = -.7, p = .5$; Visit 3: $t(36) = -.5, p = .6$).

No significant relationships were found between Age of onset of CF and the acceptance of Soft Mashed food (Visit 2: $X^2(1, N = 46) = 1.0, p = .3$; Visit 3: $X^2(1, N = 46) = .8, p = .4$),

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Bite and dissolve (Visit 2: $X^2(1, N = 46) = 1.1, p = .3$; Visit 3: $X^2(1, N = 46) = .4, p = .5$), Bite and chew (Visit 2: $X^2(1, N = 46) = .8, p = .4$; Visit 3: $X^2(1, N = 46) = .8, p = .4$), or Bite and Lump (Visit 2: $X^2(1, N = 46) = 1.1, p = .3$; Visit 3: $X^2(1, N = 46) = .1, p = .7$) at either Visits.

Discussion

This is the first study exploring CF practices in the UK and Italy, since the WHO has changed the criteria about the introduction of complementary foods (WHO, 1989). Four main findings emerged from this study. First, that although there was variation between the countries in the advice given to mothers about when to start CF, there was a remarkable similarity in the actual practice, with most infants being introduced to complementary food before 6 months of age. Second, despite the broad concerns about early onset of CF, early introduction of complementary foods had no effect on infant willingness to eat. Third, there were no differences between early and late onset of CF with regard to food textures accepted by infants. Fourth, no differences were found between exclusive breast-fed and non-exclusive breast-fed infants with regard to age of CF, or between early and late onset of CF in relation to infant BMI.

Overall, these findings suggest that single age recommendations about the introduction of complementary foods are not warranted, and given maternal practices of judging on the basis of perceived infant needs, may in fact be problematic.

Advice regarding the age of onset of CF differed by country and the structures of health care systems; in Italy paediatricians' advice about age of onset of CF varied between 4 and 6 months but in the UK, health visitors' advice was that CF should begin at around 6 months. Despite these differences, mothers in Portsmouth and Rome introduced complementary food to their infants within approximately the same range of ages. In neither country did average age of onset of CF conform to the WHO or the DoH, UK, recommendations, but it did fit within the ESPGHAN and EFSA recommendations. These results are in line with Caton,

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Ahern, and Hetherington (2011), who also found that British mothers tend to introduce complementary food at around 20 weeks, 4 weeks earlier than recommended by the WHO and the DoH in the UK. However, the results of this study show that, contrary to previous findings (Caton et al., 2011), birth weight did have an effect on age of onset of CF; infants with early onset of CF were lighter at birth than infants with late onset of CF, especially in Portsmouth. This may mean that mothers were perceiving rapid catch up growth in these infants; however, it is difficult to establish this given that comparisons cannot be made between birth weight and subsequent BMI. On the other hand, the results showed no differences between ages of onset of CF in terms of breast/formula feeding. This is in contrast with previous findings that breastfeeding mothers introduce complementary food later comparing to formula feeding mothers (Caton et al., 2011).

Interestingly, the results also show that BLW infants were introduced to complementary foods at a late age in comparison to SF infants; however, surprisingly, the age at which BLW infants were offered foods ranged between 17 and 28 weeks. This demonstrates that, in some cases, even in BLW infants the onset of CF was early than recommended by the DoH, UK.

In keeping with previous research (Harris, 1988) the present study found that in the UK, mothers' reasons for introducing complementary food depended on their judgements of infant needs. In Italy, on the other hand, mothers acted more on paediatricians' advice. Infant birth weight seemed to be a factor in the decision, especially in the UK, with lower birth weight infants being introduced to complementary food earlier. These findings are consistent with Hodges, Hughes, Hopkinson, and Fisher (2008), who argued that maternal decisions regarding the introduction of complementary foods are related to maternal perceptions of infant hunger.

To understand the mechanism behind mothers' choices in Portsmouth and Rome, it is important to highlight the different roles that health professionals have in the two countries; in

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Italy, it is very common for the mother and infant to visit the paediatrician once a month during the first year of the infant's life (Fabris, 2003). In the UK, the procedure is different as the health visitor usually visits the mother for the first time around 10 days after the infant is born (NHS, 2013). After that, mothers can meet the health visitor at the child health clinic (NHS, 2013), but these visits are usually voluntary and there are no routine visits to a paediatrician unless parents have a concern regarding their infant's health. Therefore, Italian mothers might have met the paediatrician often during the first year of the infant's life, and consequently Italian mothers might have received more advice; also, the paediatrician might have advised the mother surrounding her personal situation (i.e., mother's job, end of maternity leave) and around the infant's needs (i.e., whether the infant is under or overweight). On the other hand, health visitors might have followed the guidelines more consistently, without having the opportunity to visit the infants again and give further advice to mothers about their infant's health. British mothers reported seeking advice from the internet, family and friends, more than Italian mothers; this might have helped them to make decisions about when to introduce complementary food to their infants. Although advice received from health professionals varied in Portsmouth and Rome, mothers in both countries started complementary feeding at around the same infant age.

The relevance of national health and employment systems on mothers' decisions about feeding was found by Negayama, Norimatsu, Barratt, and Bouville (2012), who showed that French mothers had earlier onset of CF than Japanese and American mothers, but primarily because they had to go back to work. The present study demonstrates that even in countries with different attitudes towards food (Rozin et al., 2006) and different infant health care systems (NHS, 2016), the decision about the introduction of complementary foods tended to be a more infant-focused one, whether made by the mother alone based on her judgement of infant needs or made by the mother and paediatrician together. This supports the idea that

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mothers know exactly when infants are ready for complementary food (Caton et al., 2011), making their own feeding decisions based on the individual infant rather than only on the infant's age (Satter, 2000).

One key finding from this study is that the fairly large variation in age of onset of CF did not relate to any negative effects in terms of infant willingness to eat. This demonstrates that age of CF does not influence infant food acceptance; other factors may be more relevant than infant age per se, for example mother-infant interaction during mealtime. On the other hand, introducing complementary foods before 6 months may help the infant to accept different foods and textures. Indeed, according to Harris (1993), Coulthard, Harris, and Emmet (2009), and Northstone, Emmett, Nethersole, and ALSPAC Study Team (2001), problems of food acceptance may be more frequent if the onset of CF is delayed until after 6 months of infant age.

In conclusion, it is important to highlight that the present study is limited by the relatively small sample size. The current study also relied on parental reports (i.e., the data were extracted from semi-structured interviews); however, this method was previously used by Sloan and colleagues in a study published in 2007 (see Sloan et al., 2007). In addition, the mothers in this sample did not report to find any difficulty recalling the information regarding the CF process. Nonetheless, the findings that have emerged from this exploratory study need to be taken into account; indeed, this study shows that mothers both in Portsmouth and Rome introduced complementary food between 4 and 6 months even though British and Italian mothers were advised differently by health professionals. Maternal judgements about infant needs (with or without the consent of health professionals) seemed to influence the decision about when to introduce complementary food. Most importantly, there were no negative effects on infant willingness to eat food for early feeders, neither immediately after the introduction of complementary foods nor at 7 months of infant age.

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Finally, the present study highlights the importance of exploring the contradictory advice about when to introduce complementary foods to infants. The transition from milk to complementary feeding may be physically and mentally difficult for mothers, but advice about when to introduce complementary foods needs to take into account mothers' opinions as well as information about the needs of specific infants. Individual and culturally varying choices about when to introduce complementary foods to infants are a reality, as are the findings that the age of onset of CF is not a significant factor in infant willingness to accept food. Thus, official advice needs to adapt to this reality and assimilate the possibility of individual and cultural variations.

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Table 1.

Complementary feeding practices across the world

Country	CF practice	Reference
Nigeria	From 1 month of infant age	Ogunba (2010)
Tibet	During the first month of an infant's life	Dang, Yan, Yamamoto, Wang, & Zeng (2005)
Egypt	From 40 days of an infant's life	Harrison, Zaghoul, Gala, & Gabr (1993)
South Africa	Between 2 and 3 months of infant age	Kruger (2003)
Saudi Arabia	Between 1 and 6 months of infant age	Al-Shoshan (2007)
France	Between 3 and 6 months of infant age	Maier, Chabanet, Schaal, Leathwood, & Issanchou (2007)
Germany	At 6 months of infant age	Maier, Chabanet, Schaal, Leathwood, & Issanchou (2007)
Switzerland	Between 5 and 6 months of infant age	Dratva, Merten, & Ackermann-Liebrich (2006)
Spain	At around 4 months of infant age	van den Boom, Kimber & Morgan (1995)
Italy	At around 4 months of infant age	Giovannoni et al. (2004)
UK	Before 4 months of infant age	Savage, Reilly, Edwards, & Durnin (1998)
	At around 5 months of infant age	Caton, Ahern, & Hetherington (2011)

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Table 2.

Recommendations about complementary feeding in Europe

European country	Recommended age
Belgium	Between 4 and 6 months
Czech Republic	No general advice. On a case by case basis each advice depends on the health and development of the infant and his/her specific needs
Denmark	About 6 months (not before 4 months)
Estonia	After 6 months, before that only if medical reason
Finland	Individually, but not later than 6 months
Germany	Not before 5 months and not after 7 months
Greece	Not before 4 months and not after 6 months
Hungary	About 6 months, but in lack of breastfeeding the age of 4 months earliest
Ireland	Formula-fed infants should start not before 17 weeks and not after 26 weeks
Italy	The starting age has to be discussed with the paediatrician
Lithuania	From 6 months
Netherlands	From 6 months
Norway	Breast-fed infants: After 6 months, but if needed earliest at 4 months. Non breast-fed infants: Between 4 and 6 months
Poland	Breast-fed infants: gruel or cereal from 4 months, meals from 6 months. Non breast-fed infants: From 4 months
Romania	When infants are developmentally ready, for most infant between 4 and 6 months. Optimal age is from 5 and half months to 6 months
Spain	From 4 to 6 months
Sweden	About 6 month
United Kingdom	Around 6 months

Note. Adapted from “Scientific opinion on the appropriate age for introduction of complementary feeding on infants” by EFSA, 2009, *EFSA Journal*, 7, pp. 10-11.

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Table 3.

Participants' characteristics: Entire sample, British and Italian groups

Demographic variables		Entire sample (N = 46)	British (n = 23)	Italian (n = 23)	Statistical comparison
Mother's age (in years)	<i>M (SD)</i>	31.7 (4.4)	31.5 (4.8)	32.0 (4.0)	$t(44) = -.4, p = .7$
Mother's education					$\chi^2 (2, N = 46) = 4.3, p = .1$
Secondary school		39%	30%	48%	
Higher education		57%	70%	44%	
Mother's ethnicity					$\chi^2 (1, N = 46) = 1.0, p = .3$
Caucasian		98%	96%	100%	
Marital status					$\chi^2 (2, N = 46) = 3.2, p = .2$
Married/living with partner		98%	100%	96%	
Infant gender					$\chi^2 (1, N = 46) = < .001, p = 1.0$
Female		61%	61%	61%	
Male		39%	39%	39%	
Infant birth order					$\chi^2 (1, N = 46) = 3.3, p = .07$
First		61%	48%	48%	
Subsequent		39%	52%	52%	
Infant age at Visit 1	<i>M (SD)</i>	17.4 (3.0)	17.5 (2.8)	17.0 (3.3)	$t(44) = .5, p = .6$
Infant age at Visit 2	<i>M (SD)</i>	22.1 (2.8)	22.5 (2.8)	21.7 (2.8)	$t(44) = 1.0, p = .3$
Infant age at Visit 3	<i>M (SD)</i>	34.13 (7.83)	43.68 (48.40)	47.61 (65.55)	$t(44) = .8, p = .5$

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Infant birth weight (in kg)	<i>M (SD)</i>	3.5 (.4)	3.5 (.5)	3.5 (.4)	$t(44) = .3, p = .8$
Infant BMI at Visit 2	<i>M (SD)</i>	17.5 (1.9)	18.2 (2.0)	17.2 (1.6)	$t(44) = 1.7, p = .1$
Infant BMI at Visit 3	<i>M (SD)</i>	18.1 (1.7)	18.3 (1.7)	17.8 (1.7)	$t(44) = .9, p = .4$
CF methods					$\chi^2 (1, N = 46) = 5.5, p = .02$
SF infants		83%	70%	96%	
BLW infants		17%	30%	4%	

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Table 4.

Description of food textures

Soft mashed: Fairly smooth with small soft lumps (i.e., mashed potatoes)

Bite and dissolve: Dissolve in the mouth and do not need chewing but do need enough control to hold in the mouth until it dissolves (i.e., rice cake)

Bite and chew: Need some chewing in the mouth before being swallowed (i.e., pear, melon, soft biscuits)

Bite and lump: Need good chewing skills (i.e., raw apple, crusty bread, pizza)

Table 5.

Advice received and sought: Entire sample, British and Italian groups

Advice	Entire sample	British	Italian	Statistical comparison
Books and leaflets	78%	87%	70%	$\chi^2 (1, N = 46) = 2.0, p = .2$
Internet	31%	44%	17%	$\chi^2 (1, N = 46) = 3.7, p < .05$
Family	39%	30%	48%	$\chi^2 (1, N = 46) = 1.4, p = .2$
Friends	57%	65%	48%	$\chi^2 (1, N = 46) = 1.4, p = .2$

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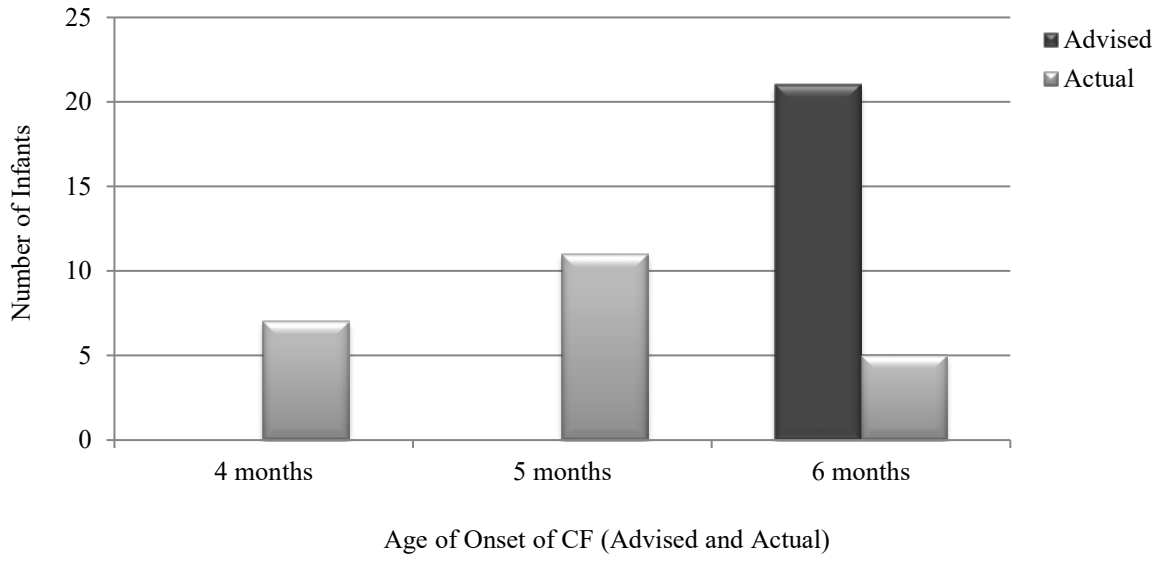


Figure 1. Age of onset of CF in the UK.

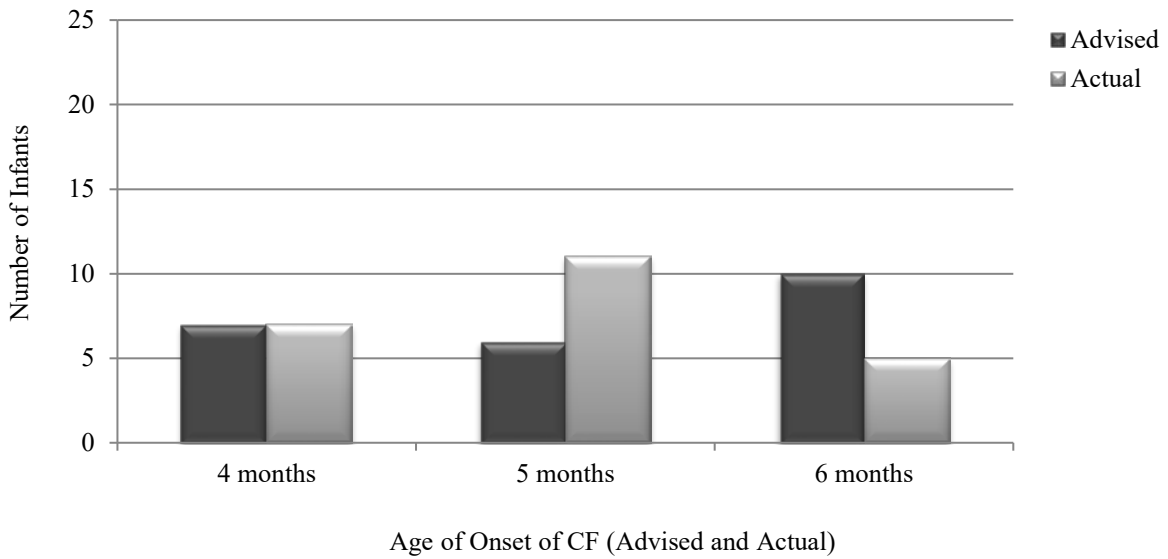


Figure 2. Age of onset of CF in Italy.