



**An exploratory study of healthcare professionals' and parents' knowledge of, attitudes to, and experiences with, Baby-Led Weaning**

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2012-001542
Article Type:	Research
Date Submitted by the Author:	23-May-2012
Complete List of Authors:	Cameron, Sonya; University of Otago, Human Nutrition Heath, Anne-Louise; University of Otago, Human Nutrition Taylor, Rachael; University of Otago, Medical and Surgical Sciences
<b>Primary Subject Heading</b>:	Nutrition and metabolism
Secondary Subject Heading:	Paediatrics, General practice / Family practice
Keywords:	NUTRITION & DIETETICS, Community child health < PAEDIATRICS, PRIMARY CARE

SCHOLARONE™  
Manuscripts

1  
2  
3  
4  
5  
6 An exploratory study of healthcare professionals' and parents' knowledge of,  
7 attitudes to, and experiences with, Baby-Led Weaning  
8  
9

5

10  
11  
12 Sonya L Cameron<sup>1</sup>  
13 Anne-Louise M Heath<sup>1</sup>  
14 Rachael W Taylor<sup>2</sup>  
15  
16  
17

10

18 From the  
19  
20 Departments of Human Nutrition<sup>1</sup> and Medicine<sup>2</sup>  
21  
22 University of Otago  
23  
24 Dunedin, New Zealand  
25  
26

15

27  
28  
29 Address correspondence to:

30 Name: Anne-Louise M Heath

31 Mailing address: Department of Human Nutrition, University of Otago, PO Box

32  
33  
34  
35 20 56, Dunedin, New Zealand 9054

36 Telephone: 64 3 479 8379

37 Fax: 64 3 479 7958

38 Email: anne-louise.heath@otago.ac.nz  
39  
40  
41  
42

25

43  
44  
45 **Key words** Healthcare professionals, parents, complementary feeding, baby-  
46 led weaning.  
47

48 **Word count** = 4609  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

## 30 ABSTRACT

**Objective:** Baby-Led Weaning (BLW) is an alternative approach for introducing complementary foods to infants that emphasizes infant self-feeding rather than adult spoon-feeding. Here we examined healthcare professionals' and parents' knowledge of, attitudes to, and experiences with, BLW.

**Design, setting and participants:** Healthcare professionals (n=31) and parents who had used BLW (n=20) completed a semi-structured interview using one of two tailored interview schedules examining their knowledge of, attitudes to, and experiences with, BLW. Interview notes and transcripts were analysed using content analysis to identify patterns and extract illustrative quotes.

**Results:** Healthcare professionals in the main had limited direct experience with BLW and the main concerns raised were the potential for increased risk of choking, iron deficiency, and inadequate energy intake. Although they suggested a number of potential benefits of BLW (greater opportunity for shared family meal times, fewer mealtime battles, healthier eating behaviours, greater convenience, and possible developmental advantages) most felt reluctant to recommend BLW because of their concern about the potential increased risk of choking. By contrast, parents who had used this style of feeding reported no major concerns with BLW. They considered BLW to be a healthier, more convenient and less stressful way to introduce complementary foods to their infant and recommended this feeding approach to other parents. Although parents did not report being concerned about choking, 30% reported at least one choking episode – most commonly with raw apple.

**Conclusion:** Given the lack of research on BLW, further work is needed to determine whether the concerns expressed by healthcare professionals and potential benefits outlined by parents are valid. The current study suggests healthcare professionals should specifically discourage parents who plan to use or are using BLW from offering raw apple.

**ARTICLE SUMMARY**

## 65 Article focus

- Healthcare professionals are an important source of information for parents during the complementary feeding period.
- The literature suggests that there is a mismatch between healthcare professionals' and parents' knowledge and attitudes to infant feeding.
- 70 • Baby-Led Weaning (BLW) is an alternative approach for introducing complementary foods to infants that is becoming increasingly popular with parents.

## Key messages

- 75 • Healthcare professionals identified a number of potential benefits of BLW including more shared family meals, promotion of healthier eating behaviours and greater convenience for parents. However, healthcare professionals also had strong concerns about the risk of iron deficiency, inadequate energy intake and choking, and as a result  
80 most felt reluctant to recommend it.
- Parents who had practised BLW reported more benefits and had fewer concerns about BLW than healthcare professionals.
- Healthcare professionals should specifically discourage parents who plan to use or are using BLW from offering raw apple.

85

## Strengths and limitations of this study

- This is the first study to interview healthcare professionals about BLW.
- The healthcare professionals and parents were self-selected.

## INTRODUCTION

1  
2  
3  
4  
5 90 Traditionally the method of infant feeding recommended to parents in most  
6 developed countries, including the United Kingdom and New Zealand, has  
7 been to spoon-feed their infant puréed food before moving on to mashed and  
8 finger foods as the child grows. [1-3] Recently an alternative approach,  
9 known as Baby-Led Weaning (BLW), has emerged[4 5] and anecdotal  
10 evidence suggests that many parents are attempting BLW. [6] Baby-Led  
11 Weaning recommends that instead of spoon-feeding, parents encourage their  
12 infant to self-feed. The small body of existing research suggests that BLW is  
13 feasible for most 6-month old infants from a motor development point of  
14 view. [7] It also suggests that BLW is associated with lower levels of maternal  
15 anxiety, restriction, pressure to eat and monitoring during the  
16 complementary feeding period; [8] and perhaps healthier eating patterns and  
17 BMI. [9] However, in the absence of any longitudinal or randomized  
18 controlled trial data, it is not possible to determine whether these  
19 associations are causal.

20  
21  
22 100  
23  
24  
25  
26  
27  
28  
29  
30  
31 105  
32 Healthcare professionals are an important source of information for parents  
33 during the complementary feeding period, and can potentially have as much  
34 influence on decisions around milk feeding and introducing solids as cultural  
35 values or material resources. [10 11] However, healthcare professionals'  
36 knowledge and attitudes about infant feeding often differ from those of  
37 parents. [12 13]

38  
39  
40  
41  
42  
43  
44  
45  
46  
47 115  
48 Previous studies on healthcare professionals' knowledge and attitudes  
49 towards infant feeding have focused on milk feeding or timing of the  
50 introduction of complementary food. [14-17] To date no study has examined  
51 attitudes to BLW in healthcare professionals working with young families.

52  
53  
54  
55  
56 120  
57 The aim of this explorative study was to examine the knowledge of, attitudes  
58 to, and experiences with, BLW of healthcare professionals and of parents who  
59 had used this style of feeding with their infant.  
60

## METHODS

### Participants

The participants were 31 healthcare professionals who were working with infants and families, and 20 parents (mothers of children aged 8 months – 2 years) who had used BLW when introducing solids to their infant.

Participants were recruited by email “snowballing”, word of mouth (healthcare professional peer-to-peer networks, parenting groups, La Leche League), or newspaper advertising. The study was approved by the Human Ethics Committee of the University of Otago, Dunedin, New Zealand.

### Data collection

The data were collected during 2010 in Dunedin, New Zealand. Healthcare professionals were interviewed at their place of work and mothers in their own home. The same researcher (SC) conducted all interviews, which typically lasted 1 - 1.5 hours.

### Interview schedule and process

The two interview schedules used were developed from the existing literature about BLW[7 8 18] and the expert opinion of the authors (Table 1 and Table 2). As some healthcare professionals had not heard of BLW, a brief description of BLW was given at the start of the interview when necessary. Interviews were conducted in a flexible manner that allowed participants to share their opinions and experiences in relation to the questions.

**Table 1 Questions used in interviews with healthcare professionals**

1. What is your professional role?
2. Have you heard of Baby-led Weaning (BLW)?
3. Where did you hear about BLW?
4. When did you hear about BLW?
5. If somebody asked you what BLW is, how would you describe it?
6. What do you think of BLW as an alternative method for introducing solid foods to infants?
7. Do you consider there may be benefits of BLW?
8. Do you consider there may be disadvantages of BLW?

9. Do you have any concerns about BLW?

## Table 2 Questions used in interviews with parents who had used Baby-Led Weaning

1. If someone asked you: "What is Baby-Led Weaning (BLW)?" what would you tell them?
  2. How did you hear about BLW?
  3. Why did you decide to try BLW?
  4. How old was your baby when you started BLW?
  5. How old is she now?
  6. How much of her food do you feed her and how much does she feed herself?
  7. Where did/do you get most of your information about BLW?
  8. What were the first foods you offered your baby?
  9. What form were the foods in that you first offered your baby?
  10. Were there any foods you avoided because you were using BLW?
  11. Did your baby eat at the same time as the rest of the family?
  12. Do you think your baby is a fussy or picky eater?
  13. Were you worried about BLW in any way?
  14. Did your baby gag on food?
  15. Was it food she had fed herself?
  16. Did your baby ever choke on food?
  17. Was it food she had fed herself?
  18. Do you consider there were advantages of BLW for you and your baby?
  19. Do you consider there were disadvantages of BLW for you and your baby?
  20. Overall, do you think BLW worked for you and your baby?
  21. Would you recommend other parents try BLW?
  22. Do you have any useful tips for other parents trying BLW?
- NB: "She" or "he" was used appropriately for the sex of the child.

### 150 Data analysis

Field notes were taken during the interviews with healthcare professionals and extended immediately following the meeting. Interviews with mothers were tape-recorded and transcribed verbatim. Content analysis [19] was performed on all interviews by reviewing all transcripts several times for recurring patterns (reviewing the two groups separately). Saturation of patterns was evident with no new patterns emerging after interview number 12 (mothers) and 14 (healthcare professionals). Interesting or important

1  
2  
3 patterns communicated by the interviewees were highlighted. Data analysis  
4 was led by one member of the research team (SC); and interpretation was  
5  
6 160 verified during research team meetings (with RWT and ALH) to scrutinise  
7  
8 emerging patterns. Each pattern has been summarized, and illustrative  
9  
10 quotes are included.

## 11 12 13 **RESULTS**

14 165 Thirty-one healthcare professionals were interviewed, comprising: practice  
15  
16 nurses (n=11), Well-Child providers (a government funded service  
17  
18 supporting families with young children and assessing health status, see:  
19 <http://www.wellchild.org.nz/>) (n=4), dietitians (n=4), general practitioners  
20  
21 (n=3), paediatricians (n=2), lactation consultants (n=2), midwives (n=2), and  
22  
23 170 a paediatric speech-language therapist (n=1). The parents were twenty  
24  
25 mothers who had a child aged 8 – 24 months (mean=13 months).

### 26 27 28 **Healthcare Professionals**

29  
30 The patterns that emerged were remarkably consistent across the interviews  
31  
32 175 with healthcare professionals.

### 33 34 35 **Knowledge**

36  
37 Nearly half (n=13/31) of the healthcare professionals had heard about BLW.  
38  
39 Most of these had been introduced to the concept by their colleagues or  
40  
41 180 friends and family (rather than patients). The healthcare professionals who  
42  
43 knew about BLW described it as the child feeding themselves whole foods,  
44  
45 instead of being spoon-fed purées. There was little discussion of other aspects  
46  
47 of BLW.

### 48 49 50 **Attitudes**

51  
52 All healthcare professionals considered that BLW could be beneficial for the  
53  
54 family and the child.

55  
56 Healthcare professionals considered that **shared family mealtimes** would be  
57  
58 190 the main advantage of BLW. They were aware of the nutritional and  
59  
60



1  
2  
3 psychological benefits of family meals and they envisaged family mealtimes  
4 would be easier and more pleasant with BLW:  
5

6 *The best thing is that an adult can eat their meal while the child is*  
7 *having theirs. There's no juggling trying to feed the baby while shoving a*  
8 *spoonful for yourself. (General Practitioner)*  
9  
10 195

11  
12  
13 Some healthcare professionals thought **mealtime battles** would be less likely  
14 with BLW for two reasons: parents would have an alternative approach to try  
15 if their child refused to be spoon-fed; and because BLW allows the child to eat  
16 at their own pace and stop when they have had enough, they would not be  
17  
18 200  
19  
20 "bribed" or "forced" to eat food:  
21

22 *I think it's healthier that the baby is in control of what they eat... and you*  
23 *aren't forcing them to eat...there's far too many of us who just finish our*  
24 *plates instead of stopping when we are full. (Dietitian)*  
25  
26 205

27  
28 Overall, healthcare professionals thought BLW would encourage healthier  
29 dietary behaviours by promoting a **wider variety of foods** and allowing the  
30 child to explore and learn about food at their own pace:  
31

32 *Being able to look at it, hold it and see it as food, instead of slop must*  
33 *have advantages? (Paediatrician)*  
34  
35 210  
36  
37

38 They also considered BLW would encourage **better appetite and self-**  
39 **regulation skills**, as parents would be less able to control the child's food  
40 intake. They saw similarities between BLW and breastfeeding on demand  
41 and thought the two would complement each other well.  
42  
43 215  
44  
45

46  
47 A number of healthcare professionals who had children of their own thought  
48 BLW would be **more convenient** than the conventional method of spoon-  
49 feeding purées:  
50

51  
52 220 *It sounds so much easier. Making purées is time consuming, and then*  
53 *they hardly eat anything and you have to throw it all out or you buy*  
54 *those jars of food, which are really expensive. (Dietitian)*  
55  
56  
57  
58  
59  
60

1  
2  
3 Healthcare professionals suggested two **developmental advantages**: BLW  
4 225 might encourage better oral and chewing skills because the child is offered  
5  
6 pieces of food to eat so they may have more opportunity to develop their  
7  
8 mouth and jaw movements instead of sucking food from a spoon as they do  
9  
10 with purées; and enhanced fine motor skills as the child has greater  
11  
12 opportunities to manipulate food with their fingers and practice their fine  
13 230 motor movements.

14  
15  
16 However, in addition to these potential benefits, strong concerns about BLW  
17  
18 were also expressed.

19  
20  
21 235 **Choking** was a major concern expressed by many of the healthcare  
22  
23 professionals, particularly those who had not observed BLW. The potential  
24  
25 risk of choking meant most healthcare professionals felt reluctant to  
26  
27 recommend BLW:

28  
29  
30 240 *The potential for choking would make me feel very hesitant about giving*  
31  
32 *my child whole food at 6 months. As a health professional I'd need to see*  
33  
34 *some sound evidence before I could endorse this method [BLW].*  
35  
36 *(Dietitian)*

37  
38  
39 245 The specific concerns voiced regarding choking were that a 6 month old  
40  
41 infant would not be developmentally ready to chew whole pieces of food and  
42  
43 that parents may leave the infant alone in their highchair with their food.  
44  
45 Additionally healthcare professionals considered that parents may become  
46  
47 competitive about their infant's BLW progress, considering that their child is  
48  
49 more advanced if they have certain foods or a greater variety of foods earlier  
50  
51 than other children, and therefore might be motivated to offer unsafe foods  
52  
53 that would increase the child's risk of choking:

54  
55  
56 255 *Just give the baby that food, she'll be fine. Sometimes it's almost like a*  
57  
58 *challenge to see how they cope, another one of those competitive*  
59  
60 *parenting things...oh look she's eating raw carrot at age 6 months.*  
*(Dietitian)*

1  
2  
3 Healthcare professionals considered that there were two possible dietary  
4 disadvantages with BLW: the potential for **growth faltering**, and for **poor**  
5 **iron status**. There was concern that adopting BLW would mean forgoing any  
6  
7  
8 260 iron-fortified infant cereal, and that a BLW diet would comprise low-energy  
9 low-iron fruits and vegetables and include very few iron-rich foods. In  
10 addition to low-energy foods, clumsy self-feeding (particularly at the  
11 beginning of BLW) might lead to growth faltering. Contrasting this, a few  
12 healthcare professionals thought BLW infants could consume energy beyond  
13  
14  
15  
16  
17 265 their needs as a result of **poor food choices**:

18 *Young children arrive here and they're under two eating twisties [an*  
19 *extruded cereal snack], chocolate biscuits - would BLW be that for some*  
20 *parents? (Practice Nurse)*  
21  
22  
23  
24

25 270 At the other extreme, some healthcare professionals commented that parents  
26 (especially first-time parents) are often apprehensive about their infant's  
27 growth and compare it to that of other infants and that a "chubby" or "bonny"  
28 baby is viewed as healthy even when it reflects overweight or obesity. Some  
29 healthcare professionals suggested BLW may **increase parental anxiety**.  
30  
31  
32  
33 275 They thought parents would struggle watching their infant learn to eat,  
34 especially at the start when they might eat very little:

35  
36  
37 *Parents expect to see their child growing consistently - linear growth -*  
38 *and if they do not this evokes anxiety. How would you know if the child*  
39 *was eating enough? Parents would not cope with the child playing with*  
40 *food and not eating it. (Practice Nurse)*  
41  
42 280  
43  
44

45 Finally, some healthcare professionals thought BLW would be **messy** for the  
46 parents and suggested that there would be a lot of food wasted, which many  
47 parents would not tolerate:  
48  
49

50 285 *I could imagine in the first couple of weeks that the infant wouldn't eat*  
51 *much and that there would be an awful lot of playing and squashing.*  
52  
53 *Some parents may not be able to cope with this. (Practice Nurse)*  
54  
55

## 56 Experiences

57  
58  
59  
60

290 Some healthcare professionals had observed BLW. The experiences that  
 shaped their knowledge and attitudes to BLW are listed in Table 3.

Table 3 Healthcare professionals experiences with Baby-Led Weaning	
Attitude formed from experience	Supporting quote
Concern about energy and nutrient sufficiency of BLW	<i>"The two parents I know who have chosen BLW are offering only fruits and vegetables...Although fruits and vegetables are great foods, babies need more nutrients... So I wonder how they would get these [nutrients] if they were only having fruits and vege...nutrients could be limited but also the variety of food that a child is exposed to." (General Practitioner)</i>
Concern about mess	<i>"I would be concerned about the mess and wastage of food. Some of our families live on a very tight food budget and I've seen the mess when doing BLW and I think a lot of food gets wasted." (Well Child Provider)</i>
Concern about increased risk of choking Concern about poor food choices	<i>"I would also be very wary of choking. Much stricter BLW guidelines on the foods to offer children (size, shape and texture) are needed not only for choking but also for health reasons. One mother I know thought a Tim-Tam [chocolate coated cream filled biscuit] was the perfect BLW food." (Dietitian)</i>

## 295 **Parents**

The patterns that emerged were very consistent across the interviews with parents.

300 Most parents (n=18/20) started BLW when their child was 5.5 - 6 months of  
 age and all parents had exclusively breastfed their child up until this age. The  
 BLW approach advises parents to watch for signs of developmental readiness  
 before introducing their child to solid food. However most parents recalled  
 starting solids at an age based on advice from their healthcare professional or  
 because they were following the WHO guidelines, although a small number  
 305 (n=2/20) of parents started solids when their infant started reaching out for  
 food.

1  
2  
3 The most commonly offered first foods were vegetables (steamed or boiled  
4 pumpkin, potato, kumara (New Zealand sweet potato), broccoli, carrot)  
5  
6 310 (n=13/20) and fruit (avocado, banana) (n=11/20). Most parents (n=16/20)  
7  
8 reported that their child shared every meal with one or more family  
9  
10 members. Parents liked that their child could feed themselves with BLW,  
11  
12 however many (n=15/20) also reported some spoon-feeding, although this  
13  
14 was infrequent or only in unusual circumstances, such as when their child  
15 315 was sick. Parents reported doing this to avoid mess, to increase iron intake by  
16  
17 spoon-feeding iron-fortified infant cereal, or to increase energy intake  
18  
19 especially when their infant was sick or appeared too tired to self-feed.  
20

### 21 Knowledge

22  
23 320 The majority of parents defined BLW as having 3 main components: offering  
24  
25 finger-sized pieces of food, allowing the child to be in control of how much  
26  
27 they ate, and not spoon-feeding purées:

28  
29 *Letting your baby lead in terms of the pace and amount of solids*  
30  
31 *eaten...offering them whole, safe foods when they are physically ready to*  
32 325 *feed themselves... keeping milk [breast/formula] as their main food*  
33  
34 *source until they naturally increase the amount they eat and drop milk*  
35  
36 *feeds on their own. (Parent 2)*  
37

38  
39 Nearly half of the parents first heard about BLW through a parenting group  
40 330 while others had discovered it online or were told about it by their Well-Child  
41  
42 provider. One mother had not heard of the term “Baby-Led Weaning” but said  
43  
44 “*it was instinctive*” to offer her child pieces of food and allow them to feed  
45  
46 themselves. The majority of parents obtained their BLW information from  
47  
48 online sources, drawing on other parents’ experiences through blogs, threads  
49 335 and forums.  
50

### 51 Attitudes

52  
53 The main reason parents chose to follow BLW was because it “*made sense*”  
54  
55 and “*seemed logical*”. Lifestyle reasons also motivated parents to follow BLW.  
56  
57  
58  
59  
60

1  
2  
3 340 They considered that BLW was **less time consuming** and **less expensive**  
4 than making puréed food:

5  
6 *With three other children, I was way too busy to prepare special foods i.e.*  
7 *purées and also I didn't want to buy them - they're expensive. (Parent 15)*  
8  
9

10  
11 345 Parents considered that there were advantages of BLW during the  
12 complementary feeding period, and also in the future. During the  
13 complementary feeding period, parents reported **less meal preparation** (the  
14 baby ate what the family was eating, there was no purée preparation) and  
15 **reduced mealtime stress** because they were not spoon-feeding the baby and  
16 eating their own meal simultaneously. Some parents (n=6/20) reported it  
17 was liberating that BLW does not include a detailed step-by-step weaning  
18 protocol and instead **promotes responding to the infant** and thought that  
19 fewer "rules" made the **transition to food less frightening and**  
20 **complicated:**

21  
22 355 *With my first child I became so worried about getting the food*  
23 *[purées] to exactly the right consistency. It [BLW] made sense to me,*  
24 *because she was demand fed so it seemed like the natural*  
25 *progression. (Parent 8)*  
26  
27

28  
29  
30  
31  
32  
33  
34  
35  
36  
37 360 In addition parents believed that BLW had encouraged their child to develop  
38 healthier eating behaviours, for example being **able to respond**  
39 **appropriately to hunger and satiety cues**, sharing **family meals** and eating  
40 a **wider variety of foods:**

41  
42  
43  
44 365 *I felt it would give my daughter the opportunity to experience, from the*  
45 *outset, everything that is pleasurable about food, the textures, colours,*  
46 *individual tastes...a lovely way to have them be a real participant in the*  
47 *meal – eating what we eat, copying us, and really joining in...not being*  
48 *fed separately. (Parent 2)*  
49  
50  
51  
52

53  
54 370 Most parents had no concerns with BLW (n=15/20). Those parents who did  
55 have concerns were worried about the appropriateness of certain foods, for  
56 example raw apple. Current guidelines on types of BLW foods to offer are  
57  
58  
59  
60

1  
2  
3 incomplete and some parents reported **not knowing what foods to offer** at  
4 what age:

5  
6 375 *I wasn't worried but a bit concerned that some of the advice was*  
7 *conflicting e.g. the book says apple is fine and people I've spoken to who*  
8 *have used BLW have said no apples. (Parent 7)*  
9  
10  
11

12  
13 One mother was concerned about her infant's **iron intake**, so she spoon-fed  
14 her infant iron fortified rice cereal daily while following BLW. Other parents  
15 380 felt that the iron from breast milk would be adequate until the infant started  
16 eating high iron meat or meat alternatives:  
17  
18

19  
20 *Solids are just a taste and texture thing, breast milk or formula being*  
21 *their main nutrition until 9 months, so don't worry if your baby takes*  
22 *their time adjusting to solids. (Parent 6)*  
23 385  
24  
25  
26

27 Nearly all parents (n=19/20) reported that their infant gagged on food. Some  
28 parents had completed a first aid course prior to their infant starting BLW to  
29 equip themselves for dealing with gagging or choking. **Gagging was not a**  
30 **concern** to parents, instead they considered it was a natural part of a child  
31 390 learning to eat and adapting to new textures that are quite different to milk.  
32 Parents were aware that an infant's gag reflex is much further forward on  
33 their tongue when they first start eating and because of this, they understood  
34 gagging was highly likely:  
35  
36  
37  
38  
39

40 395 *I felt like I was really prepared, I had read the book [4] so knew about*  
41 *gagging and choking and that mostly it is gagging because the baby's*  
42 *gag reflex is much further forward than an adult's...gagging is a very*  
43 *important learning process. (Parent 12)*  
44  
45  
46

47 Parents viewed gagging as an innate safety mechanism that is activated when  
48 400 food has not been sufficiently chewed for swallowing. One parent explained  
49 that gagging returned the food to the front of the mouth for further chewing  
50 and that if the infant did not gag then the food could cause obstruction and  
51 possibly choking.  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 405 Parents were aware **choking** was a common criticism of BLW, and although  
4 most reported that choking did not occur, 30% (n=6/20) reported one or  
5 more episodes. Although choking can be very serious, all parents who  
6 reported choking (n=6/20) reported that the infant independently dealt with  
7 the choking by expelling the food from their mouth through coughing and  
8  
9  
10  
11 410 parents did not have to intervene with first aid. All parents who could recall  
12 the food that was responsible (n=4/6) reported that raw apple was the food  
13 their infant had choked on. Parents expressed feeling more relaxed around  
14 four weeks after introducing complementary foods; they saw that their infant  
15 could manage different textures, and was developing more coordinated eating  
16  
17  
18  
19  
20 415 skills. Parents also felt that by this time the difference between gagging and  
21 choking was more obvious and that they realised it was mostly gagging.  
22  
23

24  
25 Many of the parents reported that **mealtime mess** was the main  
26 disadvantage of BLW. Infants were able to pick up their food and “squash,  
27  
28 420 smear and throw it”. Some parents were apprehensive about their infant  
29 eating in public or at other people’s homes because of the mess. Mess was  
30 more of a problem in the early phases of BLW when the infant had not  
31 mastered the coordination skills needed to get food to their mouth, and  
32  
33  
34  
35  
36  
37 425 had experience with the conventional method of starting solids thought finger  
38 foods and self-feeding were messy whatever the age:  
39

40 *As someone who’s done it both ways [BLW and spoon-feeding], I think*  
41 *they’re both pretty messy and wasteful! (Parent 5)*  
42  
43  
44

45  
46 430 Some parents recalled feeling impatient during the first month of BLW as  
47 their infant, while learning to eat, could spend **long periods of time at the**  
48 **table** and appear to be “*playing with food*”. Additionally parents reported that  
49 **some family meals were not appropriate** for their baby and that at these  
50 times knowing what to offer the infant was a challenge:  
51  
52  
53

54 435 *I struggled with the “baby eats what the family eats” concept... Most of*  
55 *what we really eat has a lot of salt, sugar, sauces, etc in it, and it takes*  
56  
57  
58  
59  
60



work to think of how to adjust it or intervene in the cooking process to fit baby. (Parent 5)

440 Parents recalled encountering both positive and negative experiences during the BLW period, however all the mothers concluded that they would recommend BLW to other parents:

*I couldn't imagine any other way of introducing solids and will certainly do BLW with any future children. I think the fact that our son has control over eating means that he doesn't have to fight for control...food is not a battleground here. (Parent 19)*

Two parents added that they would recommend supplementing BLW with some spoon-feeding for reassurance about nutrients:

450 *I say to people to use a combination. I felt good about this because she was able to explore food and learn about it but at the same time get the nutrients that she needed. (Parent 15)*

### Experiences

455 Table 4 presents practical recommendations parents offered for overcoming challenges when using BLW.

**Table 4 Practical recommendations from parents for successful Baby-Led Weaning**

Practical recommendation	Supporting quote
Place a large cloth under the infant's highchair to collect spilled food - the cloth could be shaken outside and washed in the machine.	<i>"Prepare for mess with bibs, strip the child, messy mats, have a washcloth handy, a hungry dog to eat scraps helps too and then relax and let them go for it."</i>
Use full cover (sweatshirt) bibs.	
In the warmer (summer) months the family could try eating outside.	

Put the infant in their highchair with their nappy on. Then follow with a bath to wash off any food mess.	
Put infant in the highchair in the kitchen so they can begin their meal while the family meal is being prepared and interact with them while they are eating.	<i>"Watch your baby but don't interfere, I wouldn't like someone picking food off my plate and putting it into my mouth because they thought I was eating too slowly. Not to worry too much about quantities - remembering that milk is still on offer."</i>
Seek advice from parenting groups and others doing BLW. Collect and share food and recipe ideas.	<i>Sometimes you get stuck for ideas of what to offer and talking to others doing BLW can get the creativity going again... It's amazing how many ways there are to cook and present food.</i>
Parents, whether following BLW or not, should complete a first aid course. This should teach the difference between gagging and choking, and can improve confidence for dealing with choking (if it occurs).	<i>"Go to a first aid course, preferably one targeted at parents. This will give you confidence to deal with choking if it happens."</i>
Have realistic expectations about mess and your infant's eating progress. Parents need to appreciate that starting solids is a transition period which may last many months.	<i>"Don't think that things will be heaps easier in the short-term than the conventional way. A baby with finger food will still need a lot of support, because they'll drop things a lot and need you to pick them up."</i>
Try and enjoy the BLW experience by allowing the baby to explore food and have fun with eating.	<i>"Don't stress about the quantities they eat, the mess they make or the seemingly frequent gagging episodes."</i>

460

## DISCUSSION

Although anecdotal reports suggest that the use of BLW is increasing, fewer than half of the healthcare professionals in the current study had heard about this approach. Those who were aware of BLW had limited knowledge of the details and were not aware of all the practices promoted as part of BLW. [4 5] Healthcare professionals suggested potential benefits of BLW (greater opportunity for shared family meal times, fewer mealtime battles, healthier eating behaviours, greater convenience, and possible developmental advantages) but most felt reluctant to recommend it because of their concern

1  
2  
3 470 about the potential increased risk of choking. Most healthcare professionals  
4 had not seen BLW in action and therefore had difficulty understanding how a  
5 6-month-old infant could possess the mastication and coordination skills  
6 needed to safely manage whole pieces of food.  
7  
8  
9

10  
11 475 Overall, parents reported that using BLW had been a positive experience, that  
12 they recommended it to other parents, and would follow it again if they had  
13 another child. As well as it being the *“logical way”* to introduce  
14 complementary foods, parents reported that BLW was less time consuming,  
15 involved less meal preparation, caused less stress, and resulted in fewer  
16  
17  
18  
19  
20 480 mealtime battles. Although, some parents struggled with drawn out  
21 mealtimes and the food mess created by the self-feeding infant, these  
22 disadvantages did not discourage these parents from following BLW.  
23 Furthermore, parents who had previously used the conventional method  
24 (spoon-feeding purées) with one of their older children considered both  
25  
26  
27  
28 485 approaches (BLW and conventional) to be messy.  
29  
30

31  
32 Healthcare professionals and parents' attitudes toward BLW were similar, in  
33 some respects. Both agreed that BLW may promote shared family meals,  
34 reduce mealtime battles, and be more convenient than spoon-feeding purées,  
35  
36  
37 490 they also agreed that the mess produced when an infant self-feeds could be  
38 substantial. Furthermore, both groups considered BLW could encourage  
39 healthier eating patterns, including better self-regulation of energy intake.  
40 However, there were some noticeable differences in the attitudes of the two  
41 groups, particularly concerning safety and nutrient sufficiency. Healthcare  
42  
43  
44  
45 495 professionals had serious concerns about potential choking and low iron  
46 intake, as well as the ability of an infant to self-feed at 6 months. Although  
47 some parents had considered the potential problems raised by healthcare  
48 professionals they were not as concerned by these. Moreover, they reported  
49 that these concerns decreased as they followed BLW and their baby appeared  
50  
51  
52  
53  
54 500 happy and healthy.  
55

56  
57 The healthcare professionals' concern about a possible increased risk of  
58  
59  
60

1  
2  
3 choking aligns with opinions expressed by other healthcare professionals.[5]  
4 [20 21] Choking is more likely with very hard foods such as raw apple or  
5  
6 505 round coin-shaped foods such as sausage. [22] Children develop the ability to  
7  
8 chew before they develop the ability to hold food in their mouth or to move it  
9  
10 backwards for swallowing. [23] At about 6 months of age, infants develop a  
11  
12 munching type oral-motor action; this movement, in conjunction with the  
13  
14 ability to sit unsupported, promotes swallowing of thicker, chunkier pieces of  
15 510 food. [24] The founder of BLW, Gill Rapley, disputes that a healthy 6-month-  
16  
17 old infant would be at increased risk of choking with BLW. [4] [5] Rapley  
18  
19 acknowledges gagging is common with BLW because at 6 months of age the  
20  
21 baby's gag reflex is further forward on their tongue than it is at 1 year. [5]  
22  
23 However, based on her personal observations, Rapley considers choking is  
24 515 more likely with spoon-feeding because the baby learns to use suction to take  
25  
26 the purée from the spoon, which causes food to be taken to the back of the  
27  
28 throat where it is swallowed, encouraging the infant to learn to swallow food  
29  
30 without chewing first. [5]

31  
32 520 Interestingly most parents in the current study were not concerned about  
33  
34 choking. Although some had initial concerns, these quickly diminished when  
35  
36 they witnessed how proficient their infant was at bringing food forward and  
37  
38 expelling it out of their mouth if needed, and all parents felt prepared for  
39  
40 dealing with a choking incident if it happened. Others have reported similar  
41 525 findings with mothers following BLW initially being concerned about choking  
42  
43 but over time becoming less nervous and more able to distinguish between  
44  
45 the action of gagging to move food and actual choking. [25] Furthermore  
46  
47 93.5% of the BLW group in the recent study by Townsend and Pitchford[9]  
48  
49 reported never having experienced a choking incident. It is of concern,  
50 530 however, that in the current study, 30% of parents reported at least one  
51  
52 choking incident, most with raw apple. Although no serious incidents were  
53  
54 reported, this suggests that parents who are following BLW should be  
55  
56 specifically discouraged from offering raw apple to their infant.

57 535 Healthcare professionals expressed concern about whether BLW infants  
58  
59  
60

1  
2  
3 would be able to consume sufficient iron. In New Zealand, spoon-feeding  
4 iron-fortified baby rice cereal is a popular way for parents to increase their  
5 infant's iron intake. Healthcare professionals in this study quickly recognized  
6 that this would not be possible with BLW and they speculated that this would  
7  
8  
9  
10 540 put the infant at risk of suboptimal iron status, which is already a concern for  
11 many New Zealand infants (6.9% having iron deficiency anaemia, and a  
12 further 12.5% having suboptimal iron status). [26] Most parents in the  
13 present study believed that the breast milk their infant was receiving would  
14 supply enough iron until meat or other high-iron meat alternatives were  
15  
16  
17  
18 545 introduced. Similarly, mothers from Brown and Lee[25] were not concerned  
19 about iron intake. Although healthy, term, normal birth weight infants are  
20 considered to obtain enough iron from their mother's breast milk and from  
21 the redistribution of iron from haemoglobin to iron stores during the first six  
22 months of life, [27] from six months of age, iron becomes a critical nutrient  
23 and all infants should receive iron-rich complementary foods such as meat,  
24  
25  
26 550 and all infants should receive iron-rich complementary foods such as meat,  
27 meat alternatives or iron-fortified foods. [2 27] [28-30]  
28  
29  
30

31  
32 Many of the healthcare professionals were not convinced that a 6-month old  
33 infant could eat enough to keep pace with growth when self-feeding,  
34  
35 555 particularly in the early days of complementary feeding. Only one study  
36 appears to have examined this, suggesting that there may be an increased  
37 incidence of underweight in BLW children (3/63) compared to spoon-fed  
38 children (0/63), although, as acknowledged by the authors, the numbers were  
39 small, and the cases and controls drawn from different populations. It has  
40  
41  
42  
43 560 been suggested that purées (which are frequently made of fruit or vegetables  
44 and thinned down with water or milk) are often very low in energy, meaning  
45 that the small volume of purées typically consumed in the early weeks would  
46 contribute relatively little to meeting a conventionally fed infant's nutrient  
47 requirements. [7] In contrast, finger foods, if carefully chosen, can be very  
48  
49  
50  
51 565 nutrient dense, so an infant who appears to be eating little when self-feeding  
52 may potentially be closer to meeting their nutrient requirements. [7] Only one  
53 parent in the current study reported being concerned about her child being  
54 able to eat enough. However, this was a self-selected sample, so those with  
55  
56  
57  
58  
59  
60

1  
2  
3 concerns may have discontinued or chosen not to follow BLW. At this point,  
4 570 no research has examined the actual food and nutrient intake of children  
5  
6 following a BLW approach compared with a more traditional method of infant  
7  
8 feeding.  
9

10  
11 The healthcare professionals and parents who took part in the current study  
12  
13 575 were self-selected. Furthermore, the sample size was small. However,  
14  
15 participants were recruited in a number of different ways, and the interviews  
16  
17 were continued until well after saturation was achieved for both healthcare  
18  
19 professionals and parents, suggesting that the majority of views of BLW in  
20  
21 these groups are likely to have been captured.  
22

23  
24 Although there was some agreement between healthcare professionals and  
25  
26 parents that BLW was likely to lead to more shared family meals, fewer  
27  
28 mealtime battles, potentially healthier eating patterns, and to be more  
29  
30 convenient, although messy, the healthcare professionals were, overall,  
31  
32 585 reluctant to recommend the method. They were concerned that BLW could  
33  
34 potentially increase choking and adversely affect the infant's iron status and  
35  
36 energy intake. In this context, it is interesting that the UK Department of  
37  
38 Health has supported the inclusion of some hand-held first foods in their most  
39  
40 recent recommendations for infant feeding. [31 32] Undoubtedly, further  
41  
42 590 research of BLW is warranted especially concerning its potential to positively  
43  
44 influence eating behaviours, as well as its safety and nutrient sufficiency. In  
45  
46 the meantime, the current study suggests that healthcare professionals  
47  
48 should specifically discourage parents who plan to use or are using BLW from  
49  
50 offering raw apple.  
51

52  
53 595 **Acknowledgements** We would like to thank all the families and healthcare  
54  
55 professionals who contributed to this study.  
56

57  
58 **Contributors** SC, ALH and RWT were all involved with the conception and  
59  
60 design of the study, the analysis and interpretation of the data and the writing  
and editing of this paper. SC conducted the interviews with participants and  
was responsible for the analysis and interpretation of the data. SC wrote the

1  
2  
3 first draft of the paper, and A-L H and RWT made important intellectual  
4 contributions to the content and approved the final version.

5  
6 **Funding** This research was conducted using the authors' (RWT) resources  
7  
8 605 and received no specific grant from any funding agency in the public,  
9 commercial or non-profit sectors.

10  
11 **Competing interests** None.

12  
13 **Ethical approval** Ethical approval was obtained from the University of Otago  
14 Ethics Committee.

15  
16 610 **Provenance and peer review** Not commissioned.

17  
18 **Data sharing statement** No additional data are available.  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

## REFERENCES

- 1  
2  
3  
4  
5 615  
6  
7 1. World Health Organization. Infant and young child feeding: model chapter  
8 for textbooks for medical students and allied health professionals.  
9 Geneva, Switzerland: World Health Organization, 2009.
- 10 620 2. Ministry of Health. *Food and Nutrition Guidelines for Healthy Infants and*  
11 *Toddlers (Aged 0-2): A background paper (4th Ed)*. Wellington: Ministry  
12 of Health, 2008.
- 13 3. Department of Health (DoH). *Infant Feeding*. London, UK: Department of  
14 Health, 2003.
- 15 4. Rapley G, Murkett T. *Baby-led Weaning*. London: Vermilion, 2008.
- 16 625 5. Rapley G. Baby-led weaning: transitioning to solid foods at the baby's own  
17 pace. *Community Pract* 2011;**84**(6):20-23
- 18 6. Sachs M. Baby-led weaning and current UK recommendations - are they  
19 compatible? *Matern Child Nutr* 2011;**7**:1-2 doi: doi: 10.1111/j.1740-  
20 8709.2010.00278.x.[published Online First: Epub Date]].
- 21 630 7. Wright CM, Cameron K, Tsiaka M, Parkinson KN. Is baby-led weaning  
22 feasible? When do babies first reach out for and eat finger foods?  
23 *Matern Child Nutr* 2011;**7**(1):27-33 doi: doi: 10.1111/j.1740-  
24 8709.2010.00274.x.[published Online First: Epub Date]].
- 25 8. Brown A, Lee M. Maternal control of child feeding during the weaning  
26 period: differences between mothers following a baby-led or standard  
27 weaning approach. *Matern Child Health J* 2011;**15**(8):1265-71 doi:  
28 [10.1007/s10995-010-0678-4](https://doi.org/10.1007/s10995-010-0678-4)[published Online First: Epub Date]].
- 29 635 9. Townsend E, Pitchford N. Baby knows best? The impact of weaning style on  
30 food preferences and body mass index in early childhood in a case-  
31 controlled sample. *BMJ Open* 2012;**2**:1
- 32 640 10. Abel S, Park J, Tipene-Leach D, Finau S, Lennan M. Infant care practices in  
33 New Zealand: a cross-cultural qualitative study. *Soc Sci & Med*  
34 2001;**53**(9):1135-48
- 35 11. Campbell ND, Soeken KL, Rankin EAD. Infant Weaning Patterns and  
36 Related Maternal-Infant Health Outcomes. *Public Health Nurs*  
37 1986;**3**(1):57-63 doi: 10.1111/j.1525-1446.1986.tb00466.x[published  
38 Online First: Epub Date]].
- 39 645 12. Arden MA. Conflicting influences on UK mothers' decisions to introduce  
40 solid foods to their infants. *Matern & Child Nutr* 2010;**6**(2):159-73
- 41 650 13. Wright C, Parkinson K, Drewett R. Why are babies weaned early? Data  
42 from a prospective population based cohort study. *Arch Dis Child*  
43 2004;**89**(9):813-16
- 44 14. Hellings P, Howe C. Assessment of Breastfeeding Knowledge of Nurse  
45 Practitioners and Nurse-Midwives. *J Midwifery Womens Health*  
46 2000;**45**(3):264-70
- 47 655 15. Freed GL, Clark SJ, Lohr JA, Sorenson JR. Pediatrician involvement in  
48 breast-feeding promotion: a national study of residents and  
49 practitioners. *Pediatrics* 1995;**96**(3 Pt 1):490-4
- 50 660 16. Freed GL, Clark SJ, Sorenson J, Lohr JA, Cefalo R, Curtis P. National  
51 assessment of physicians' breast-feeding knowledge, attitudes,  
52 training, and experience. *JAMA* 1995;**273**(6):472-6
- 53  
54  
55  
56  
57  
58  
59  
60



- 1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60
17. Schanler RJ, O'Connor KG, Lawrence RA. Pediatricians' practices and attitudes regarding breastfeeding promotion. *Pediatrics* 1999;**103**(3):E35 doi: 10.1542/peds.103.3.e35[published Online First: Epub Date]].
- 665
18. Brown A, Lee M. A descriptive study investigating the use and nature of baby-led weaning in a UK sample of mothers. *Matern Child Health J* 2011;**7**(1):34-47 doi: doi: 10.1111/j.1740-8709.2010.00243.x.[published Online First: Epub Date]].
- 670
19. Patton MQ. *Qualitative Research and Evaluation Methods*. 3rd ed. Thousand Oaks, California Sage Publications, Inc., 2002.
20. Dietitians NZ Paediatric SIG convenor. Dietitians NZ Paediatric Special Interest Group Newsletter. In: NZDA, ed. May ed, 2010.
21. Rowell K and Becker H. baby-led-weaning-or-starting-solids-book-review-and-nutritionist-weighs-in-with-her-7-month-old-daughter. <http://thefeedingdoctor.com>, 2011.
- 675
22. Byard RW, Gallard V, Johnson A, Barbour J, Bonython-Wright B, Bonython-Wright D. Safe feeding practices for infants and young children. *J Paediatr Child Health* 1996;**32**(4):327-9
- 680
23. Naylor A, Morrow A. *Developmental readiness of normal full term infants to progress from exclusive breastfeeding to the introduction of complementary foods: reviews of the relevant literature concerning infant immunologic, gastrointestinal, oral motor and maternal reproductive and lactational development*. Washington DC: Wellstart International, LINKAGES Project Academy for Educational Development, 2001.
- 685
24. Pridham KF. Feeding behavior of 6-to 12-month-old infants: Assessment and sources of parental information. *J Pediatr* 1990;**117**(2 (Pt 2)):S174-80
- 690
25. Brown A, Lee M. An exploration of experiences of mothers following a baby-led weaning style: developmental readiness for complementary foods. *Matern Child Health J* 2011 doi: 10.1111/j.1740-8709.2011.00360.x[published Online First: Epub Date]].
- 695
26. Soh P, Ferguson EL, McKenzie JE, Homs MY, Gibson RS. Iron deficiency and risk factors for lower iron stores in 6-24-month-old New Zealanders. *Eur J Clin Nutr* 2004;**58**(1):71-79
27. Domellof M. Iron requirements in infancy. *Ann Nutr Metab* 2011;**59**(1):59-63 doi: doi: 10.1159/000332138[published Online First: Epub Date]].
- 700
28. Leong W-I, Lönnerdal B. Iron Nutrition. In: Anderson G, McLaren G, eds. *Iron Physiology and Pathophysiology in Humans*: Humana Press, 2012:81-99.
29. Kramer MK, R. Optimal duration of exclusive breastfeeding. *Cochrane database of systematic reviews* 2002(1):CD003517
- 705
30. World Health Organization. *Guiding Principles For Complementary Feeding of the Breastfed Child*. Geneva, Switzerland, 2004.
31. Department of Health. *Start4Life: No Rush to Mush*. Secondary Start4Life: No Rush to Mush 2009.
32. National Health Service (NHS). *Your baby's first solid foods*. Secondary Your baby's first solid foods 2011.
- 710

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

For peer review only

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2,3&4
Objectives	3	State specific objectives, including any prespecified hypotheses	2
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	2&5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	N/A
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5&6
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	6&7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	N/A
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	N/A
		(b) Describe any methods used to examine subgroups and interactions	N/A
		(c) Explain how missing data were addressed	N/A
		(d) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
<b>Results</b>			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	7
		(b) Indicate number of participants with missing data for each variable of interest	N/A
Outcome data	15*	Report numbers of outcome events or summary measures	N/A
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	N/A
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	17
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	21
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	18-21
Generalisability	21	Discuss the generalisability (external validity) of the study results	21-22
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	22

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).



**Healthcare professionals' and mothers' knowledge of, attitudes to, and experiences with, Baby-Led Weaning: a content analysis study**

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2012-001542.R1
Article Type:	Research
Date Submitted by the Author:	23-Aug-2012
Complete List of Authors:	Cameron, Sonya; University of Otago, Human Nutrition Heath, Anne-Louise; University of Otago, Human Nutrition Taylor, Rachael; University of Otago, Medical and Surgical Sciences
<b>Primary Subject Heading</b>:	Nutrition and metabolism
Secondary Subject Heading:	Paediatrics, General practice / Family practice
Keywords:	NUTRITION & DIETETICS, Community child health < PAEDIATRICS, PRIMARY CARE

SCHOLARONE™  
Manuscripts

1  
2  
3  
4  
5  
6  
7  
8 Healthcare professionals' and mothers' knowledge of, attitudes to, and  
9 experiences with, Baby-Led Weaning: a content analysis study  
10 5

11  
12  
13  
14  
15  
16  
17  
18 10 Sonya L Cameron<sup>1</sup>

19 Anne-Louise M Heath<sup>1</sup>

20 Rachael W Taylor<sup>2</sup>

21  
22  
23  
24  
25 From the

26 15 Departments of Human Nutrition<sup>1</sup> and Medicine<sup>2</sup>

27 University of Otago

28 Dunedin, New Zealand  
29  
30  
31  
32  
33  
34

35 20 Address correspondence to:

36 Name: Anne-Louise M Heath

37 Mailing address: Department of Human Nutrition, University of Otago, PO Box  
38 56, Dunedin, New Zealand 9054

39 Telephone: 64 3 479 8379

40 25 Fax: 64 3 479 7958

41 Email: anne-louise.heath@otago.ac.nz  
42  
43  
44  
45  
46  
47  
48  
49  
50

51 **Key words** Healthcare professionals, mothers, complementary feeding, baby-  
52 led weaning.  
53 30

54 **Word count** = 4609  
55  
56  
57  
58  
59  
60

## ABSTRACT

**Objective:** Baby-Led Weaning (BLW) is an alternative approach for introducing complementary foods to infants that emphasizes infant self-feeding rather than adult spoon-feeding. Here we examined healthcare professionals' and mothers' knowledge of, attitudes to, and experiences with, BLW.

**Design, setting and participants:** Healthcare professionals (n=31) and mothers who had used BLW (n=20) completed a semi-structured interview using one of two tailored interview schedules examining their knowledge of, attitudes to, and experiences with, BLW. Interview notes and transcripts were analysed using content analysis to identify sub-categories and extract illustrative quotes.

**Results:** Healthcare professionals had limited direct experience with BLW and the main concerns raised were the potential for increased risk of choking, iron deficiency, and inadequate energy intake. Although they suggested a number of potential benefits of BLW (greater opportunity for shared family meal times, fewer mealtime battles, healthier eating behaviours, greater convenience, and possible developmental advantages) most felt reluctant to recommend BLW because of their concern about the potential increased risk of choking. By contrast, mothers who had used this style of feeding reported no major concerns with BLW. They considered BLW to be a healthier, more convenient and less stressful way to introduce complementary foods to their infant and recommended this feeding approach to other mothers. Although mothers did not report being concerned about choking, 30% reported at least one choking episode – most commonly with raw apple.

**Conclusion:** Given the lack of research on BLW, further work is needed to determine whether the concerns expressed by healthcare professionals and potential benefits outlined by mothers are valid. The current study suggests healthcare professionals should specifically discourage mothers who plan to use, or are using, BLW from offering raw apple.

65 **ARTICLE SUMMARY**

## 9 Article focus

- 11 • Healthcare professionals are an important source of information for  
12 mothers during the complementary feeding period.
- 14 70 • The literature suggests that there is a mismatch between healthcare  
15 professionals' and mothers' knowledge and attitudes to infant feeding.
- 17 • Baby-Led Weaning (BLW) is an alternative approach for introducing  
18 complementary foods to infants that is becoming increasingly popular  
19 with mothers.

22 75

## 24 Key messages

- 26 • Healthcare professionals identified a number of potential benefits of  
27 BLW including more shared family meals, promotion of healthier  
28 eating behaviours and greater convenience for mothers. However,  
29 healthcare professionals also had strong concerns about the risk of  
30 iron deficiency, inadequate energy intake and choking, and as a result  
31 most felt reluctant to recommend it.
- 32 80 • Mothers who had practised BLW reported more benefits and had  
33 fewer concerns about BLW than healthcare professionals.
- 34 • Healthcare professionals should specifically discourage mothers who  
35 plan to use, or are using, BLW from offering raw apple.

36 85

## 44 Strengths and limitations of this study

- 46 • This is the first study to interview healthcare professionals about BLW.
- 48 90 • The healthcare professionals and mothers were self-selected.

49



## INTRODUCTION

1  
2  
3  
4  
5 92 Traditionally the method of infant feeding recommended to mothers in most  
6 developed countries, including the United Kingdom and New Zealand, has  
7  
8 94 been to spoon-feed the infant puréed food before moving on to mashed and  
9  
10 finger foods as the child grows. [1-3] Recently an alternative approach,  
11  
12 96 known as Baby-Led Weaning (BLW), has emerged [4,5] and anecdotal  
13  
14 evidence suggests that many mothers are attempting BLW. [6] Baby-Led  
15  
16 98 Weaning recommends that instead of spoon-feeding, mothers encourage their  
17  
18 infant to self-feed, from about six months of age. Although infants following  
19  
20 the more traditional method of infant feeding may be offered finger foods, in  
21  
22 100 many countries, including New Zealand, it is recommended that this does not  
23  
24 occur until 8-9 months of age, long after the introduction of puréed food. By  
25  
26 102 contrast, BLW, in its purest form, does not include any spoon-feeding by the  
27  
28 adult. The infant is only offered pieces of whole food, appropriately prepared,  
29  
30 so that the infant can feed themselves right from the start of the  
31  
32 106 complementary feeding period.

33  
34 108 The small body of existing research suggests that BLW is feasible for most 6-  
35  
36 month old infants from a motor development point of view. [7] It also  
37  
38 110 suggests that BLW is associated with lower levels of maternal anxiety,  
39  
40 restriction, pressure to eat and monitoring during the complementary feeding  
41  
42 112 period; [8] and perhaps healthier eating patterns and BMI. [9] However, in  
43  
44 the absence of any longitudinal or randomized controlled trial data, it is not  
45  
46 114 possible to determine whether these associations are causal.

47  
48 116 Healthcare professionals are an important source of information for mothers  
49  
50 during the complementary feeding period, and can potentially have as much  
51  
52 118 influence on decisions around milk feeding and introducing solids as cultural  
53  
54 values or material resources. [10,11] However, healthcare professionals'  
55  
56 120 knowledge and attitudes about infant feeding often differ from those of  
57  
58 mothers. [12,13]

59  
60 122

Previous studies on healthcare professionals' knowledge and attitudes

1  
2  
3 124 towards infant feeding have focused on milk feeding or timing of the  
4 introduction of complementary food. [14-17] To date no study has examined  
5  
6 126 attitudes to BLW in healthcare professionals working with young families.  
7  
8

9  
10 128 The aim of this content analysis study was to examine the knowledge of,  
11 attitudes to, and experiences with, BLW of healthcare professionals and of  
12  
13 130 mothers who had used this style of feeding with their infant.  
14

## 15 16 17 132 **METHODS**

### 18 **Participants**

19  
20 134 The participants were 31 healthcare professionals who were working with  
21 infants and families, and 20 mothers who had used BLW when introducing  
22  
23 136 solids to their infant. Mothers could be part of the study if they considered  
24 that they had used BLW, so BLW was self-defined.  
25  
26

27 138  
28  
29 Participants were recruited by word of mouth (healthcare professional peer-  
30  
31 140 to-peer networks, parenting groups, La Leche League), email “snowballing”,  
32 or newspaper advertising. Twelve parenting groups were approached as a  
33  
34 142 starting point to recruit directly mothers who had tried BLW and to  
35 commence snowballing. Recruitment of the health professionals was  
36  
37 144 undertaken via established clinical relationships, and via snowballing through  
38 practice nurses. The study was approved by the Human Ethics Committee of  
39  
40 146 the University of Otago, Dunedin, New Zealand.  
41  
42

### 43 44 148 **Data collection**

45  
46 The data were collected during 2010 in Dunedin, New Zealand. Healthcare  
47  
48 150 professionals were interviewed at their place of work and mothers in their  
49 own home. The same researcher (SC) conducted all interviews, which  
50  
51 152 typically lasted 1 - 1.5 hours.  
52

### 53 54 154 **Interview schedule and process**

55  
56 Two interview schedules, one for health professionals and one for parents,  
57  
58 156 were developed from the existing literature about BLW [7,8,18] and the  
59  
60

1  
2  
3 expert opinion of the authors (Table 1 and Table 2). As some healthcare  
4  
5 158 professionals had not heard of BLW, a brief description of BLW was given at  
6  
7 the start of the interview when necessary.

8  
9 160

10 We used a semi-structured interview as outlined in Patton [19] to include, in  
11  
12 162 the first part, a structured framework to cover the same basic lines of inquiry  
13  
14 around knowledge, attitudes and experiences, for which participants could  
15  
16 164 express their own ideas and understandings. The second part of the interview  
17  
18 followed an unstructured format to allow for probing and further questioning  
19  
20 166 of ideas or individual circumstances that were not included in the original  
21  
22 interview outline.

23  
24 168

#### **Table 1 Questions used in interviews with healthcare professionals**

1. What is your professional role?
2. Have you heard of Baby-led Weaning (BLW)?
3. Where did you hear about BLW?
4. When did you hear about BLW?
5. If somebody asked you what BLW is, how would you describe it?
6. What do you think of BLW as an alternative method for introducing solid foods to infants?
7. Do you consider there may be benefits of BLW?
8. Do you consider there may be disadvantages of BLW?
9. Do you have any concerns about BLW?

25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40 170

#### **Table 2 Questions used in interviews with mothers who had used Baby-Led Weaning**

1. If someone asked you: "What is Baby-Led Weaning (BLW)?" what would you tell them?
2. How did you hear about BLW?
3. Why did you decide to try BLW?
4. How old was your baby when you started BLW?
5. How old is she now?
6. How much of her food do you feed her and how much does she feed herself?
7. Where did/do you get most of your information about BLW?
8. What were the first foods you offered your baby?
9. What form were the foods in that you first offered your baby?
10. Were there any foods you avoided because you were using BLW?

11. Did your baby eat at the same time as the rest of the family?
  12. Do you think your baby is a fussy or picky eater?
  13. Were you worried about BLW in any way?
  14. Did your baby gag on food?
  15. Was it food she had fed herself?
  16. Did your baby ever choke on food?
  17. Was it food she had fed herself?
  18. Do you consider there were advantages of BLW for you and your baby?
  19. Do you consider there were disadvantages of BLW for you and your baby?
  20. Overall, do you think BLW worked for you and your baby?
  21. Would you recommend other mothers try BLW?
  22. Do you have any useful tips for other mothers trying BLW?
- NB: "She" or "he" was used appropriately for the sex of the child.

## 172 Data analysis

174 Field notes were taken during the interviews with healthcare professionals  
175 and extended immediately following the meeting. Interviews with mothers  
176 were tape-recorded and transcribed verbatim. The main lines of inquiry  
177 (knowledge, attitudes and experiences) from the interviews were used as an  
178 initial guide in a directed content analysis [20], and are referred to here as  
179 categories. Content analysis [19] was performed on all interviews by  
180 reviewing all transcripts several times for recurring sub-categories  
181 (reviewing the two groups separately). Sub-categories were identified from  
182 manifest content (the visible, obvious components) [21], because the aim was  
183 to extract and report on the descriptive level of content and not to provide a  
184 deep level of interpretation and underlying meaning. Participants were  
185 recruited until we reached saturation of sub-categories, and we ensured that  
186 sub-categories were, as far as possible, defined so that they were exhaustive  
187 and mutually exclusive. Data analysis was led by one member of the research  
188 team (SC); and interpretation was verified during research team meetings  
189 (with RWT and ALH) to scrutinise sub-categories as they were identified.  
190 Each category and its sub-categories have been summarized, and illustrative  
191 quotes are included.

## 192 RESULTS

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

194 Thirty-one healthcare professionals were interviewed, comprising: practice  
nurses (n=11), Well-Child providers (a government funded service  
supporting families with young children and assessing health status, see:  
196 <http://www.wellchild.org.nz/>) (n=4), dietitians (n=4), general practitioners  
(n=5), paediatricians (n=2), lactation consultants (n=2), midwives (n=2), and  
198 a paediatric Speech-Language Therapist (n=1). The mothers were twenty  
mothers who had a child aged 8 – 24 months (mean=13 months).

200

### Healthcare Professionals

202 The sub-categories that emerged were remarkably consistent across the  
interviews with healthcare professionals.

204

### Knowledge

206 Nearly half (n=13/31) of the healthcare professionals had heard about BLW.  
Most of these had been introduced to the concept by their colleagues or  
208 friends and family (rather than patients). The healthcare professionals who  
knew about BLW described it as the child feeding themselves whole foods,  
210 instead of being spoon-fed purées. There was little discussion of other aspects  
of BLW.

212

### Attitudes

214 All healthcare professionals considered that BLW could be beneficial for the  
family and the child.

216

Healthcare professionals considered that **shared family mealtimes** would be  
218 the main advantage of BLW. They were aware of the nutritional and  
psychological benefits of family meals and they envisaged family mealtimes  
220 would be easier and more pleasant with BLW:

*The best thing is that an adult can eat their meal while the child is  
222 having theirs. There's no juggling trying to feed the baby while shoving a  
spoonful for yourself. (General Practitioner 3)*

224

1  
2  
3 Some healthcare professionals thought **mealtime battles** would be less likely  
4  
5 226 with BLW for two reasons: mothers would have an alternative approach to  
6  
7 try if their child refused to be spoon-fed; and because BLW allows the child to  
8  
9 228 eat at their own pace and stop when they have had enough, they would not be  
10  
11 “bribed” or “forced” to eat food:

12 230 *I think it's healthier that the baby is in control of what they eat... and you*  
13  
14 *aren't forcing them to eat...there's far too many of us who just finish our*  
15 232 *plates instead of stopping when we are full. (Dietitian 2)*  
16  
17

18 234 Overall, healthcare professionals thought BLW would encourage healthier  
19  
20 dietary behaviours by promoting a **wider variety of foods** and allowing the  
21  
22 236 child to explore and learn about food at their own pace:

23  
24 *Being able to look at it, hold it and see it as food, instead of slop must*  
25 238 *have advantages? (Paediatrician 2)*  
26  
27

28 240 They also considered BLW would encourage **better appetite and self-**  
29  
30 **regulation skills**, as mothers would be less able to control the child's food  
31  
32 242 intake. They saw similarities between BLW and breastfeeding on demand  
33  
34 and thought the two would complement each other well.

35 244  
36  
37 A number of healthcare professionals who had children of their own thought  
38  
39 246 BLW would be **more convenient** than the conventional method of spoon-  
40  
41 feeding purées:

42 248 *It sounds so much easier. Making purées is time consuming, and then*  
43  
44 *they hardly eat anything and you have to throw it all out or you buy*  
45 250 *those jars of food, which are really expensive. (Dietitian 4)*  
46  
47

48  
49 252 Healthcare professionals suggested two **developmental advantages**: BLW  
50  
51 might encourage better oral and chewing skills because the child is offered  
52  
53 254 pieces of food to eat so they may have more opportunity to develop their  
54  
55 mouth and jaw movements instead of sucking food from a spoon as they do  
56 256 with purées; and enhanced fine motor skills as the child has greater  
57  
58  
59  
60

1  
2  
3 opportunities to manipulate food with their fingers and practice their fine  
4  
5 258 motor movements:

6  
7  
8 260 *The BLW method could have real advantages for coping with food and*  
9  
10  
11  
12 262 *learning to eat i.e. for oral development. If babies are fed purées for too*  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

264 *long they miss important windows for introducing different food*  
266 *textures. (Speech-Language Therapist 1)*

264 *There must be some sort of fine motor benefits for baby being able to*  
266 *play, essentially, with its food. (General Practitioner 5)*

20 However, in addition to these potential benefits, strong concerns about BLW  
21  
22 268 were also expressed.

25 270 **Choking** was a major concern expressed by many of the healthcare  
26  
27 professionals, particularly those who had not observed BLW. The potential  
28  
29 272 risk of choking meant most healthcare professionals felt reluctant to  
30  
31 recommend BLW:

32 274 *The potential for choking would make me feel very hesitant about giving*  
33  
34  
35  
36 276 *my child whole food at 6 months. As a health professional I'd need to see*  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

278  
41  
42 280 The specific concerns voiced regarding choking were that a 6 month old  
43  
44  
45  
46 282 infant would not be developmentally ready to chew whole pieces of food and  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

284  
286  
288  
288 *that mothers may leave the infant alone in their highchair with their food.*  
*Additionally healthcare professionals considered that mothers may become*  
*competitive about their infant's BLW progress, considering that their child is*  
*more advanced if they have certain foods or a greater variety of foods earlier*  
*than other children, and therefore might be motivated to offer unsafe foods*  
*that would increase the child's risk of choking:*  
*Just give the baby that food, she'll be fine. Sometimes it's almost like a*  
*challenge to see how they cope, another one of those competitive*

parenting things...oh look she's eating raw carrot at age 6 months.

290 (Dietitian 1)

292 However, one healthcare professional considered that BLW may work well  
for parents whose infant experiences feeding problems when spoon-feeding  
294 is used:

*I know of similar feeding methods which are often used with children  
whose parents are having feeding difficulties with spoon-feeding and  
these can work very well. (Speech-Language Therapist 1)*

298

Healthcare professionals considered that there were two possible dietary  
300 disadvantages with BLW: the potential for **growth faltering**, and for **poor  
iron status**. There was concern that adopting BLW would mean forgoing any  
302 iron-fortified infant cereal, and that a BLW diet would comprise low-energy  
low-iron fruits and vegetables and include very few iron-rich foods. In  
304 addition to low-energy foods, clumsy self-feeding (particularly at the  
beginning of BLW) might lead to growth faltering.

306 *"The two parents I know who have chosen BLW are offering only fruits  
and vegetables...Although fruits and vegetables are great foods, babies  
308 need more nutrients... So I wonder how they would get these [nutrients]  
if they were only having fruits and vege...nutrients could be limited..."*

310 (General Practitioner 1)

312 Contrasting this, a few healthcare professionals thought BLW infants could  
consume energy beyond their needs as a result of **poor food choices**:

314 *Young children arrive here and they're under two eating twisties [an  
extruded cereal snack], chocolate biscuits - would BLW be that for some  
316 mothers? (Practice Nurse 2)*

318 At the other extreme, some healthcare professionals commented that mothers  
(especially first-time mothers) are often apprehensive about their infant's  
320 growth and compare it to that of other infants and that a "chubby" or "bonny"  
baby is viewed as healthy even when it reflects overweight or obesity. Some



1  
2  
3 322 healthcare professionals suggested BLW may **increase parental anxiety**.  
4 They thought mothers would struggle watching their infant learn to eat,  
5  
6 324 especially at the start when they might eat very little:  
7

8 *Parents expect to see their child growing consistently - linear growth -*  
9  
10 326 *and if they do not this evokes anxiety. How would you know if the child*  
11 *was eating enough? Parents would not cope with the child playing with*  
12 *food and not eating it. (Practice Nurse 7)*  
13 328

14  
15  
16  
17 330 Finally, some healthcare professionals thought BLW would be **messy** and for  
18 the mothers and suggested that there would be a lot of food wasted, which  
19  
20 332 many mothers would not tolerate:

21 *I could imagine in the first couple of weeks that the infant wouldn't eat*  
22  
23 334 *much and that there would be an awful lot of playing and squashing.*  
24 *Some mothers may not be able to cope with this. (Practice Nurse 11)*  
25

26 336  
27  
28 *I would be concerned about the mess and wastage of food. Some of our*  
29  
30 338 *families live on a very tight food budget and I've seen the mess when*  
31 *doing BLW and I think a lot of food gets wasted." (Well Child Provider 1)*  
32

33 340  
34  
35

## 36 342 **Mothers**

37  
38 The sub-categories that emerged were very consistent across the interviews  
39  
40 344 with mothers.  
41

42  
43  
44 346 Most mothers (n=18/20) started BLW when their child was 5.5 - 6 months of  
45 age and all mothers had exclusively breastfed their child up until this age. The  
46  
47 348 BLW approach advises mothers to watch for signs of developmental  
48 readiness before introducing their child to solid food. However most mothers  
49  
50 350 recalled starting solids at an age based on advice from their healthcare  
51 professional or because they were following the WHO guidelines, although a  
52  
53 352 small number (n=2/20) of mothers started solids when their infant started  
54 reaching out for food.  
55

56 354  
57  
58  
59  
60

1  
2  
3 The most commonly offered first foods were vegetables (steamed or boiled  
4 356 pumpkin, potato, kumara (New Zealand sweet potato), broccoli, carrot)  
5  
6 (n=13/20) and fruit (avocado, banana) (n=11/20). Most mothers (n=16/20)  
7  
8 358 reported that their child shared every meal with one or more family  
9  
10 members. Mothers liked that their child could feed themselves with BLW,  
11  
12 360 however many (n=15/20) also reported some spoon-feeding, although this  
13  
14 was infrequent or only in unusual circumstances, such as when their child  
15  
16 362 was sick. Mothers reported doing this to avoid mess, to increase iron intake  
17  
18 by spoon-feeding iron-fortified infant cereal, or to increase energy intake  
19  
20 especially when their infant was sick or appeared too tired to self-feed.

### 21 366 **Knowledge**

22  
23 The majority of mothers defined BLW as having 3 main components: offering  
24  
25 368 finger-sized pieces of food, allowing the child to be in control of how much  
26  
27 they ate, and not spoon-feeding purées:

28 370 *Letting your baby lead in terms of the pace and amount of solids*  
29  
30 *eaten...offering them whole, safe foods when they are physically ready to*  
31  
32 372 *feed themselves... keeping milk [breast/formula] as their main food*  
33  
34 *source until they naturally increase the amount they eat and drop milk*  
35  
36 374 *feeds on their own. (Mother 2)*

37  
38  
39 376 Nearly half of the mothers first heard about BLW through a parenting group  
40  
41 while others had discovered it online or were told about it by their Well-Child  
42  
43 378 provider. One mother had not heard of the term “Baby-Led Weaning” but said  
44  
45 “*it was instinctive*” to offer her child pieces of food and allow them to feed  
46  
47 380 themselves. The majority of mothers obtained their BLW information from  
48  
49 online sources, drawing on other mothers’ experiences through blogs, threads  
50  
51 382 and forums.

### 52 384 **Attitudes**

53  
54 The main reason mothers chose to follow BLW was because it “*made sense*”  
55  
56 386 and “*seemed logical*”. Lifestyle reasons also motivated mothers to follow  
57  
58  
59  
60

1  
2  
3 BLW. They considered that BLW was **less time consuming** and **less**  
4 **expensive** than making puréed food:

5  
6 *With three other children, I was way too busy to prepare special foods i.e.*  
7 *purées and also I didn't want to buy them - they're expensive. (Mother*  
8 *15)*

9  
10  
11 392

12  
13 Mothers considered that there were advantages of BLW during the  
14 complementary feeding period, and also in the future. During the  
15 complementary feeding period, mothers reported **less meal preparation**  
16 (the baby ate what the family was eating, there was no purée preparation)  
17 and **reduced mealtime stress** because they were not spoon-feeding the baby  
18 and eating their own meal simultaneously. Some mothers (n=6/20) reported  
19 it was liberating that BLW does not include a detailed step-by-step weaning  
20 protocol and instead **promotes responding to the infant** and thought that  
21 fewer "rules" made the **transition to food less frightening and**  
22 **complicated:**

23  
24  
25 *With my first child I became so worried about getting the food*  
26 *[purées] to exactly the right consistency. It [BLW] made sense to me,*  
27 *because she was demand fed so it seemed like the natural*  
28 *progression. (Mother 8)*

29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39 408 In addition mothers believed that BLW had encouraged their child to develop  
40 healthier eating behaviours, for example being **able to respond**  
41 **appropriately to hunger and satiety cues**, sharing **family meals** and eating  
42 a **wider variety of foods:**

43  
44  
45 *I felt it would give my daughter the opportunity to experience, from the*  
46 *outset, everything that is pleasurable about food, the textures, colours,*  
47 *individual tastes...a lovely way to have them be a real participant in the*  
48 *meal - eating what we eat, copying us, and really joining in...not being*  
49 *fed separately. (Mother 2)*

50  
51  
52  
53  
54  
55  
56 418 Most mothers had no concerns with BLW (n=15/20). Those mothers who did  
57 have concerns were worried about the appropriateness of certain foods, for  
58  
59  
60

1  
2  
3 420 example raw apple. Current guidelines on types of BLW foods to offer are  
4 incomplete and some mothers reported **not knowing what foods to offer** at  
5  
6 422 what age:

7  
8 *I wasn't worried but a bit concerned that some of the advice was*  
9  
10 424 *conflicting e.g. the book says apple is fine and people I've spoken to who*  
11 *have used BLW have said no apples. (Mother 7)*  
12

426

13  
14 One mother was concerned about her infant's **iron intake**, so she spoon-fed  
15  
16 428 her infant iron fortified rice cereal daily while following BLW. Other mothers  
17 felt that the iron from breast milk would be adequate until the infant started  
18  
19 eating high iron meat or meat alternatives:  
20 430

21 *Solids are just a taste and texture thing, breast milk or formula being*  
22 *their main nutrition until 9 months, so don't worry if your baby takes*  
23 432 *their time adjusting to solids. (Mother 6)*  
24  
25

434

26  
27  
28 Nearly all mothers (n=19/20) reported that their infant gagged on food. Some  
29  
30 436 mothers had completed a first aid course prior to their infant starting BLW to  
31 equip themselves for dealing with gagging or choking. **Gagging was not a**  
32  
33 438 **concern** to mothers, instead they considered it was a natural part of a child  
34 learning to eat and adapting to new textures that are quite different to milk.  
35  
36 Mothers were aware that an infant's gag reflex is much further forward on  
37 440 their tongue when they first start eating and because of this, they understood  
38  
39 gagging was highly likely:  
40 442

41  
42 *I felt like I was really prepared, I had read the book [4] so knew about*  
43 444 *gagging and choking and that mostly it is gagging because the baby's*  
44 *gag reflex is much further forward than an adult's...gagging is a very*  
45 *important learning process. (Mother 12)*  
46  
47 446

48  
49 Mothers viewed gagging as an innate safety mechanism that is activated when  
50  
51 448 food has not been sufficiently chewed for swallowing. One parent explained  
52 that gagging returned the food to the front of the mouth for further chewing  
53  
54 450 and that if the infant did not gag then the food could cause obstruction and  
55 possibly choking.  
56

452

1  
2  
3 Mothers were aware **choking** was a common criticism of BLW, and although  
4  
5 454 most reported that choking did not occur, 30% (n=6/20) reported one or  
6  
7 more episodes. Although choking can be very serious, all mothers who  
8  
9 456 reported choking (n=6/20) reported that the infant independently dealt with  
10  
11 the choking by expelling the food from their mouth through coughing and  
12  
13 458 mothers did not have to intervene with first aid. All mothers who could recall  
14  
15 the food that was responsible (n=4/6) reported that raw apple was the food  
16  
17 460 their infant had choked on. Mothers expressed feeling more relaxed around  
18  
19 462 four weeks after introducing complementary foods; they saw that their infant  
20  
21 could manage different textures, and was developing more coordinated eating  
22  
23 464 skills. Mothers also felt that by this time the difference between gagging and  
24  
25 choking was more obvious and that they realised it was mostly gagging.

26  
27 466 Many of the mothers reported that **mealtime mess** was the main  
28  
29 disadvantage of BLW. Infants were able to pick up their food and “squash,  
30  
31 468 smear and throw it”. Some mothers were apprehensive about their infant  
32  
33 eating in public or at other people’s homes because of the mess. Mess was  
34  
35 470 more of a problem in the early phases of BLW when the infant had not  
36  
37 mastered the coordination skills needed to get food to their mouth, and  
38  
39 472 mothers said as the level of skill improved the mess declined. Mothers who  
40  
41 also had experience with the conventional method of starting solids thought  
42  
43 474 finger foods and self-feeding were messy whatever the age:

44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56 476 *As someone who’s done it both ways [BLW and spoon-feeding], I think  
57  
58 they’re both pretty messy and wasteful! (Mother 5)*

59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100  
101  
102  
103  
104  
105  
106  
107  
108  
109  
110  
111  
112  
113  
114  
115  
116  
117  
118  
119  
120  
121  
122  
123  
124  
125  
126  
127  
128  
129  
130  
131  
132  
133  
134  
135  
136  
137  
138  
139  
140  
141  
142  
143  
144  
145  
146  
147  
148  
149  
150  
151  
152  
153  
154  
155  
156  
157  
158  
159  
160  
161  
162  
163  
164  
165  
166  
167  
168  
169  
170  
171  
172  
173  
174  
175  
176  
177  
178  
179  
180  
181  
182  
183  
184  
185  
186  
187  
188  
189  
190  
191  
192  
193  
194  
195  
196  
197  
198  
199  
200  
201  
202  
203  
204  
205  
206  
207  
208  
209  
210  
211  
212  
213  
214  
215  
216  
217  
218  
219  
220  
221  
222  
223  
224  
225  
226  
227  
228  
229  
230  
231  
232  
233  
234  
235  
236  
237  
238  
239  
240  
241  
242  
243  
244  
245  
246  
247  
248  
249  
250  
251  
252  
253  
254  
255  
256  
257  
258  
259  
260  
261  
262  
263  
264  
265  
266  
267  
268  
269  
270  
271  
272  
273  
274  
275  
276  
277  
278  
279  
280  
281  
282  
283  
284  
285  
286  
287  
288  
289  
290  
291  
292  
293  
294  
295  
296  
297  
298  
299  
300  
301  
302  
303  
304  
305  
306  
307  
308  
309  
310  
311  
312  
313  
314  
315  
316  
317  
318  
319  
320  
321  
322  
323  
324  
325  
326  
327  
328  
329  
330  
331  
332  
333  
334  
335  
336  
337  
338  
339  
340  
341  
342  
343  
344  
345  
346  
347  
348  
349  
350  
351  
352  
353  
354  
355  
356  
357  
358  
359  
360  
361  
362  
363  
364  
365  
366  
367  
368  
369  
370  
371  
372  
373  
374  
375  
376  
377  
378  
379  
380  
381  
382  
383  
384  
385  
386  
387  
388  
389  
390  
391  
392  
393  
394  
395  
396  
397  
398  
399  
400  
401  
402  
403  
404  
405  
406  
407  
408  
409  
410  
411  
412  
413  
414  
415  
416  
417  
418  
419  
420  
421  
422  
423  
424  
425  
426  
427  
428  
429  
430  
431  
432  
433  
434  
435  
436  
437  
438  
439  
440  
441  
442  
443  
444  
445  
446  
447  
448  
449  
450  
451  
452  
453  
454  
455  
456  
457  
458  
459  
460  
461  
462  
463  
464  
465  
466  
467  
468  
469  
470  
471  
472  
473  
474  
475  
476  
477  
478  
479  
480  
481  
482  
483  
484  
485  
486  
487  
488  
489  
490  
491  
492  
493  
494  
495  
496  
497  
498  
499  
500  
501  
502  
503  
504  
505  
506  
507  
508  
509  
510  
511  
512  
513  
514  
515  
516  
517  
518  
519  
520  
521  
522  
523  
524  
525  
526  
527  
528  
529  
530  
531  
532  
533  
534  
535  
536  
537  
538  
539  
540  
541  
542  
543  
544  
545  
546  
547  
548  
549  
550  
551  
552  
553  
554  
555  
556  
557  
558  
559  
560  
561  
562  
563  
564  
565  
566  
567  
568  
569  
570  
571  
572  
573  
574  
575  
576  
577  
578  
579  
580  
581  
582  
583  
584  
585  
586  
587  
588  
589  
590  
591  
592  
593  
594  
595  
596  
597  
598  
599  
600  
601  
602  
603  
604  
605  
606  
607  
608  
609  
610  
611  
612  
613  
614  
615  
616  
617  
618  
619  
620  
621  
622  
623  
624  
625  
626  
627  
628  
629  
630  
631  
632  
633  
634  
635  
636  
637  
638  
639  
640  
641  
642  
643  
644  
645  
646  
647  
648  
649  
650  
651  
652  
653  
654  
655  
656  
657  
658  
659  
660  
661  
662  
663  
664  
665  
666  
667  
668  
669  
670  
671  
672  
673  
674  
675  
676  
677  
678  
679  
680  
681  
682  
683  
684  
685  
686  
687  
688  
689  
690  
691  
692  
693  
694  
695  
696  
697  
698  
699  
700  
701  
702  
703  
704  
705  
706  
707  
708  
709  
710  
711  
712  
713  
714  
715  
716  
717  
718  
719  
720  
721  
722  
723  
724  
725  
726  
727  
728  
729  
730  
731  
732  
733  
734  
735  
736  
737  
738  
739  
740  
741  
742  
743  
744  
745  
746  
747  
748  
749  
750  
751  
752  
753  
754  
755  
756  
757  
758  
759  
760  
761  
762  
763  
764  
765  
766  
767  
768  
769  
770  
771  
772  
773  
774  
775  
776  
777  
778  
779  
780  
781  
782  
783  
784  
785  
786  
787  
788  
789  
790  
791  
792  
793  
794  
795  
796  
797  
798  
799  
800  
801  
802  
803  
804  
805  
806  
807  
808  
809  
810  
811  
812  
813  
814  
815  
816  
817  
818  
819  
820  
821  
822  
823  
824  
825  
826  
827  
828  
829  
830  
831  
832  
833  
834  
835  
836  
837  
838  
839  
840  
841  
842  
843  
844  
845  
846  
847  
848  
849  
850  
851  
852  
853  
854  
855  
856  
857  
858  
859  
860  
861  
862  
863  
864  
865  
866  
867  
868  
869  
870  
871  
872  
873  
874  
875  
876  
877  
878  
879  
880  
881  
882  
883  
884  
885  
886  
887  
888  
889  
890  
891  
892  
893  
894  
895  
896  
897  
898  
899  
900  
901  
902  
903  
904  
905  
906  
907  
908  
909  
910  
911  
912  
913  
914  
915  
916  
917  
918  
919  
920  
921  
922  
923  
924  
925  
926  
927  
928  
929  
930  
931  
932  
933  
934  
935  
936  
937  
938  
939  
940  
941  
942  
943  
944  
945  
946  
947  
948  
949  
950  
951  
952  
953  
954  
955  
956  
957  
958  
959  
960  
961  
962  
963  
964  
965  
966  
967  
968  
969  
970  
971  
972  
973  
974  
975  
976  
977  
978  
979  
980  
981  
982  
983  
984  
985  
986  
987  
988  
989  
990  
991  
992  
993  
994  
995  
996  
997  
998  
999  
1000

478 Some mothers recalled feeling impatient during the first month of BLW as  
479 their infant, while learning to eat, could spend **long periods of time at the**  
480 **table** and appear to be “*playing with food*”. Additionally mothers reported  
481 that **some family meals were not appropriate** for their baby and that at  
482 these times knowing what to offer the infant was a challenge:

483  
484  
485  
486  
487  
488  
489  
490  
491  
492  
493  
494  
495  
496  
497  
498  
499  
500  
501  
502  
503  
504  
505  
506  
507  
508  
509  
510  
511  
512  
513  
514  
515  
516  
517  
518  
519  
520  
521  
522  
523  
524  
525  
526  
527  
528  
529  
530  
531  
532  
533  
534  
535  
536  
537  
538  
539  
540  
541  
542  
543  
544  
545  
546  
547  
548  
549  
550  
551  
552  
553  
554  
555  
556  
557  
558  
559  
560  
561  
562  
563  
564  
565  
566  
567  
568  
569  
570  
571  
572  
573  
574  
575  
576  
577  
578  
579  
580  
581  
582  
583  
584  
585  
586  
587  
588  
589  
590  
591  
592  
593  
594  
595  
596  
597  
598  
599  
600  
601  
602  
603  
604  
605  
606  
607  
608  
609  
610  
611  
612  
613  
614  
615  
616  
617  
618  
619  
620  
621  
622  
623  
624  
625  
626  
627  
628  
629  
630  
631  
632  
633  
634  
635  
636  
637  
638  
639  
640  
641  
642  
643  
644  
645  
646  
647  
648  
649  
650  
651  
652  
653  
654  
655  
656  
657  
658  
659  
660  
661  
662  
663  
664  
665  
666  
667  
668  
669  
670  
671  
672  
673  
674  
675  
676  
677  
678  
679  
680  
681  
682  
683  
684  
685  
686  
687  
688  
689  
690  
691  
692  
693  
694  
695  
696  
697  
698  
699  
700  
701  
702  
703  
704  
705  
706  
707  
708  
709  
710  
711  
712  
713  
714  
715  
716  
717  
718  
719  
720  
721  
722  
723  
724  
725  
726  
727  
728  
729  
730  
731  
732  
733  
734  
735  
736  
737  
738  
739  
740  
741  
742  
743  
744  
745  
746  
747  
748  
749  
750  
751  
752  
753  
754  
755  
756  
757  
758  
759  
760  
761  
762  
763  
764  
765  
766  
767  
768  
769  
770  
771  
772  
773  
774  
775  
776  
777  
778  
779  
780  
781  
782  
783  
784  
785  
786  
787  
788  
789  
790  
791  
792  
793  
794  
795  
796  
797  
798  
799  
800  
801  
802  
803  
804  
805  
806  
807  
808  
809  
810  
811  
812  
813  
814  
815  
816  
817  
818  
819  
820  
821  
822  
823  
824  
825  
826  
827  
828  
829  
830  
831  
832  
833  
834  
835  
836  
837  
838  
839  
840  
841  
842  
843  
844  
845  
846  
847  
848  
849  
850  
851  
852  
853  
854  
855  
856  
857  
858  
859  
860  
861  
862  
863  
864  
865  
866  
867  
868  
869  
870  
871  
872  
873  
874  
875  
876  
877  
878  
879  
880  
881  
882  
883  
884  
885  
886  
887  
888  
889  
890  
891  
892  
893  
894  
895  
896  
897  
898  
899  
900  
901  
902  
903  
904  
905  
906  
907  
908  
909  
910  
911  
912  
913  
914  
915  
916  
917  
918  
919  
920  
921  
922  
923  
924  
925  
926  
927  
928  
929  
930  
931  
932  
933  
934  
935  
936  
937  
938  
939  
940  
941  
942  
943  
944  
945  
946  
947  
948  
949  
950  
951  
952  
953  
954  
955  
956  
957  
958  
959  
960  
961  
962  
963  
964  
965  
966  
967  
968  
969  
970  
971  
972  
973  
974  
975  
976  
977  
978  
979  
980  
981  
982  
983  
984  
985  
986  
987  
988  
989  
990  
991  
992  
993  
994  
995  
996  
997  
998  
999  
1000

*I struggled with the “baby eats what the family eats” concept... Most of  
what we really eat has a lot of salt, sugar, sauces, etc in it, and it takes*

1  
2  
3 *work to think of how to adjust it or intervene in the cooking process to fit*  
4  
5 486 *baby. (Mother 5)*  
6  
7

8 488 Mothers recalled encountering both positive and negative experiences during  
9 the BLW period, however all the mothers concluded that they would  
10  
11 490 recommend BLW to other mothers:

12  
13 *I couldn't imagine any other way of introducing solids and will certainly*  
14 492 *do BLW with any future children. I think the fact that our son has*  
15 *control over eating means that he doesn't have to fight for control...food*  
16 494 *is not a battleground here. (Mother 19)*  
17  
18  
19

20  
21 496 Two mothers added that they would recommend supplementing BLW with  
22 some spoon-feeding for reassurance about nutrients:  
23

24 498 *I say to people to use a combination. I felt good about this because she*  
25 *was able to explore food and learn about it but at the same time get the*  
26 500 *nutrients that she needed. (Mother 15)*  
27  
28  
29  
30

## 31 502 **Experiences**

32 Table 3 presents practical recommendations mothers offered for overcoming  
33  
34 504 challenges when using BLW.  
35  
36  
37  
38  
39

40 506

**Table 3 Practical recommendations from mothers for successful Baby-Led Weaning**

Practical recommendation	Supporting quote
Place a large cloth under the infant's highchair to collect spilled food - the cloth could be shaken outside and washed in the machine.	<i>"Prepare for mess with bibs, strip the child, messy mats, have a washcloth handy, a hungry dog to eat scraps helps too and then relax and let them go for it."</i>
Use full cover (sweatshirt) bibs.	
In the warmer (summer) months the family could try eating outside.	

<p>Put the infant in their highchair with their nappy on. Then follow with a bath to wash off any food mess.</p>	
<p>Put infant in the highchair in the kitchen so they can begin their meal while the family meal is being prepared and interact with them while they are eating.</p>	<p><i>“Watch your baby but don’t interfere, I wouldn’t like someone picking food off my plate and putting it into my mouth because they thought I was eating too slowly. Not to worry too much about quantities – remembering that milk is still on offer.”</i></p>
<p>Seek advice from parenting groups and others doing BLW. Collect and share food and recipe ideas.</p>	<p><i>Sometimes you get stuck for ideas of what to offer and talking to others doing BLW can get the creativity going again... It’s amazing how many ways there are to cook and present food.</i></p>
<p>Mothers, whether following BLW or not, should complete a first aid course. This should teach the difference between gagging and choking, and can improve confidence for dealing with choking (if it occurs).</p>	<p><i>“Go to a first aid course, preferably one targeted at parents. This will give you confidence to deal with choking if it happens.”</i></p>
<p>Have realistic expectations about mess and your infant’s eating progress. Mothers need to appreciate that starting solids is a transition period which may last many months.</p>	<p><i>“Don’t think that things will be heaps easier in the short-term than the conventional way. A baby with finger food will still need a lot of support, because they’ll drop things a lot and need you to pick them up.”</i></p>
<p>Try and enjoy the BLW experience by allowing the baby to explore food and have fun with eating.</p>	<p><i>“Don’t stress about the quantities they eat, the mess they make or the seemingly frequent gagging episodes.”</i></p>

508

## DISCUSSION

510 Although anecdotal reports suggest that the use of BLW is increasing, fewer  
 511 than half of the healthcare professionals in the current study had heard about  
 512 this approach. Those who were aware of BLW had limited knowledge of the  
 513 details and were not aware of all the practices promoted as part of BLW. [4,5]  
 514 Healthcare professionals suggested potential benefits of BLW (greater  
 515 opportunity for shared family meal times, fewer mealtime battles, healthier  
 516 eating behaviours, greater convenience, and possible developmental  
 advantages) but most felt reluctant to recommend it because of their concern

1  
2  
3 518 about the potential increased risk of choking. Most healthcare professionals  
4 had not seen BLW in action and therefore had difficulty understanding how a  
5  
6 520 6-month-old infant could possess the mastication and coordination skills  
7  
8 needed to safely manage whole pieces of food.  
9

10 522

11 Overall, mothers reported that using BLW had been a positive experience,  
12  
13 524 that they recommended it to other mothers, and would follow it again if they  
14 had another child. Interestingly, many of the mothers in this study did not  
15  
16 526 follow BLW strictly as outlined by Rapley [4]. Although they generally  
17 embraced BLW techniques, many also reported using a small amount of  
18  
19 spoon-feeding. This suggests that, in practice, many parents following a BLW  
20 528 approach are probably somewhere along the continuum of some spoon-  
21 feeding to total self-feeding, albeit much more at the latter end. As well as it  
22  
23 530 being described as the “*logical way*” to introduce complementary foods,  
24  
25 mothers reported that BLW was less time consuming, involved less meal  
26 532 preparation, caused less stress, and resulted in fewer mealtime battles.  
27  
28 Although some mothers struggled with drawn out mealtimes and the food  
29  
30 534 mess created by the self-feeding infant, these disadvantages did not  
31  
32 discourage these mothers from following BLW. Furthermore, mothers who  
33  
34 536 had previously used the conventional method (spoon-feeding purées) with  
35  
36 one of their older children considered both approaches (BLW and  
37 538 conventional) to be messy.  
38  
39

40 540

41 Healthcare professionals and mothers’ attitudes toward BLW were similar, in  
42  
43 542 some respects. Both agreed that BLW may promote shared family meals,  
44 reduce mealtime battles, and be more convenient than spoon-feeding purées,  
45  
46 they also agreed that the mess produced when an infant self-feeds could be  
47 544 substantial. Furthermore, both groups considered BLW could encourage  
48  
49 healthier eating patterns, including better self-regulation of energy intake.  
50 546  
51 However, there were some noticeable differences in the attitudes of the two  
52  
53 548 groups, particularly concerning safety and nutrient sufficiency. Healthcare  
54 professionals had serious concerns about potential choking and low iron  
55  
56 550 intake, as well as the ability of an infant to self-feed at 6 months. Although  
57  
58  
59  
60



1  
2  
3 some mothers had considered the potential problems raised by healthcare  
4  
5 552 professionals they were not as concerned by these. Moreover, they reported  
6  
7 that these concerns decreased as they followed BLW and their baby appeared  
8  
9 554 happy and healthy.

10  
11 556 The healthcare professionals' concern about a possible increased risk of  
12  
13 choking aligns with opinions expressed by other healthcare professionals.[5]  
14  
15 558 [22,23] Choking is more likely with very hard foods such as raw apple or  
16  
17 round coin-shaped foods such as sausage. [24] Children develop the ability to  
18  
19 560 chew before they develop the ability to hold food in their mouth or to move it  
20  
21 backwards for swallowing. [25] At about 6 months of age, infants develop a  
22  
23 562 munching type oral-motor action; this movement, in conjunction with the  
24  
25 ability to sit unsupported, promotes swallowing of thicker, chunkier pieces of  
26  
27 564 food. [26] The founder of BLW, Gill Rapley, disputes that a healthy 6-month-  
28  
29 566 old infant would be at increased risk of choking with BLW. [4,5] Rapley  
30  
31 acknowledges gagging is common with BLW because at 6 months of age the  
32  
33 568 baby's gag reflex is further forward on their tongue than it is at 1 year. [5]  
34  
35 However, based on her personal observations, Rapley considers choking is  
36  
37 570 more likely with spoon-feeding because the baby learns to use suction to take  
38  
39 the purée from the spoon, which causes food to be taken to the back of the  
40  
41 572 throat where it is swallowed, encouraging the infant to learn to swallow food  
42  
43 without chewing first. [5]

44  
45 574 Interestingly most mothers in the current study were not concerned about  
46  
47 choking. Although some had initial concerns, these quickly diminished when  
48  
49 576 they witnessed how proficient their infant was at bringing food forward and  
50  
51 expelling it out of their mouth if needed, and all mothers felt prepared for  
52  
53 578 dealing with a choking incident if it happened. Others have reported similar  
54  
55 findings with mothers following BLW initially being concerned about choking  
56  
57 580 but over time becoming less nervous and more able to distinguish between  
58  
59 the action of gagging to move food and actual choking. [27] Furthermore  
60  
582 93.5% of the BLW group in the recent study by Townsend and Pitchford[9]  
reported never having experienced a choking incident. It is of concern,

1  
2  
3 584 however, that in the current study, 30% of mothers reported at least one  
4 choking incident, most with raw apple. No serious incidents were reported  
5  
6 586 and this raises the question of whether mothers correctly identified choking  
7  
8 or whether they had instead witnessed the less serious action of gagging.  
9  
10 588 However, given that raw apple was the cause of most reported choking  
11 incidents, and fulfills the criteria of a high-risk food, being hard and in small  
12  
13 590 pieces when bitten, it would be sensible to discourage parents who are  
14 following BLW from offering raw apple to their infant.  
15

16  
17 592  
18 Healthcare professionals expressed concern about whether BLW infants  
19  
20 594 would be able to consume sufficient iron. In New Zealand, spoon-feeding iron-  
21 fortified baby rice cereal is a popular way for mothers to increase their  
22  
23 596 infant's iron intake. Healthcare professionals in this study quickly recognized  
24 that this would not be possible with BLW and they speculated that this would  
25  
26 598 put the infant at risk of suboptimal iron status, which is already a concern for  
27 many New Zealand infants (6.9% having iron deficiency anaemia, and a  
28  
29 600 further 12.5% having suboptimal iron status[28]). Most mothers in the  
30 present study believed that the breast milk their infant was receiving would  
31  
32 602 supply enough iron until meat or other high-iron meat alternatives were  
33 introduced. Similarly, mothers from Brown and Lee[27] were not concerned  
34  
35 604 about iron intake. Although healthy, term, normal birth weight infants are  
36 considered to obtain enough iron from their mother's breast milk and from  
37  
38 606 the redistribution of iron from haemoglobin to iron stores during the first six  
39 months of life, [29] from six months of age, iron becomes a critical nutrient  
40  
41 608 and all infants should receive iron-rich complementary foods such as meat,  
42 meat alternatives or iron-fortified foods. [2,29] [30-32]  
43  
44  
45  
46

47 610  
48  
49 Many of the healthcare professionals were not convinced that a 6-month old  
50  
51 612 infant could eat enough to keep pace with growth when self-feeding,  
52 particularly in the early days of complementary feeding. Only one study  
53  
54 614 appears to have examined this, and suggested that there may be an increased  
55 incidence of underweight in BLW children (3/63) compared to spoon-fed  
56  
57 616 children (0/63), although most children were of normal weight, and as  
58  
59  
60

1  
2  
3 acknowledged by the authors, the numbers were small, and the cases and  
4  
5 618 controls drawn from different populations. It has been suggested that purées  
6  
7 (which are frequently made of fruit or vegetables and thinned down with  
8  
9 620 water or milk) are often very low in energy, meaning that the small volume of  
10  
11 purées typically consumed in the early weeks would contribute relatively  
12  
13 622 little to meeting a conventionally fed infant's nutrient requirements. [7] In  
14  
15 contrast, finger foods, if carefully chosen, can be very nutrient dense, so an  
16  
17 624 infant who appears to be eating little when self-feeding may potentially be  
18  
19 closer to meeting their nutrient requirements. [7] Only one parent in the  
20  
21 626 current study reported being concerned about her child being able to eat  
22  
23 enough, although many mothers reported spoon-feeding their infant at times  
24  
25 628 when they were potentially at greater risk of under eating, i.e. when they  
26  
27 were unwell or very tired. Because of the nature of this self-selected sample it  
28  
29 630 is possible that mothers with concerns about this issue may have  
30  
31 discontinued or chosen not to follow BLW. At this point, no research has  
32  
33 632 examined the actual food and nutrient intake of children following a BLW  
34  
35 approach compared with a more traditional method of infant feeding.

36  
37 634  
38  
39 The healthcare professionals and mothers who took part in the current study  
40  
41 636 were self-selected. Furthermore, the sample size was small. Although this  
42  
43 study is not intended to present representative results given its qualitative  
44  
45 638 nature, participants were recruited in a number of different ways, and the  
46  
47 interviews were continued until well after saturation for both healthcare  
48  
49 640 professionals and mothers, suggesting that the majority of views of BLW in  
50  
51 these groups are likely to have been captured. The first author conducted the  
52  
53 642 content analysis of the transcripts, and although the co-authors discussed the  
54  
55 interpretation of individual participant quotes, they did not conduct a  
56  
57 644 separate full analysis of the transcripts. However, we consider that this was  
58  
59 sufficient to ensure that the findings are trustworthy, both because our aim  
60  
61 646 was to capture manifest (i.e. description of the visible, obvious components),  
62  
63 rather than latent (i.e. interpretation of underlying meaning) content [33], and  
64  
65 648 because we have provided direct participant quotes for each sub-category so  
66  
67 that the reader can judge for themselves the appropriateness of the coding.

1  
2  
3 650

4 Although there was some agreement between healthcare professionals and  
5  
6 652 mothers that BLW was likely to lead to more shared family meals, fewer  
7  
8 mealtime battles, potentially healthier eating patterns, and to be more  
9  
10 654 convenient, although messy, the healthcare professionals were, overall,  
11  
12 reluctant to recommend the method. They were concerned that BLW could  
13  
14 656 potentially increase choking and adversely affect the infant's iron status and  
15  
16 energy intake. In this context, it is interesting that the UK Department of  
17  
18 658 Health has supported the inclusion of some hand-held first foods in their most  
19  
20 recent recommendations for infant feeding. [34,35] Undoubtedly, further  
21  
22 660 research of BLW is warranted especially concerning its potential to positively  
23  
24 influence eating behaviours, as well as its safety and nutrient sufficiency. In  
25  
26 662 the meantime, the current study suggests that healthcare professionals  
27  
28 should specifically discourage mothers who plan to use, or are using, BLW  
29  
30 664 from offering raw apple.

31  
32 666 **Acknowledgements** We would like to thank all the families and healthcare  
33  
34 professionals who contributed to this study.

35  
36 668 **Contributors** SC, ALH and RWT were all involved with the conception and  
37  
38 design of the study, the analysis and interpretation of the data and the writing  
39  
40 670 and editing of this paper. SC conducted the interviews with participants and  
41  
42 was responsible for the analysis and interpretation of the data. SC wrote the  
43  
44 672 first draft of the paper, and A-L H and RWT made important intellectual  
45  
46 contributions to the content and approved the final version.

47  
48 674 **Funding** This research was conducted using the authors' (RWT) resources  
49  
50 and received no specific grant from any funding agency in the public,  
51  
52 676 commercial or non-profit sectors.

53  
54 **Competing interests** None.

55  
56 678 **Ethical approval** Ethical approval was obtained from the University of Otago  
57  
58 Ethics Committee.

59  
60 680 **Provenance and peer review** Not commissioned.

**Data sharing statement** No additional data are available.

## REFERENCES

- 684
- 686 1. World Health Organization. Infant and young child feeding: model chapter  
for textbooks for medical students and allied health professionals.  
688 Geneva, Switzerland: World Health Organization, 2009.
- 690 2. Ministry of Health. *Food and Nutrition Guidelines for Healthy Infants and  
Toddlers (Aged 0-2): A background paper (4th Ed)*. Wellington: Ministry  
of Health, 2008.
- 692 3. Department of Health (DoH). *Infant Feeding*. London, UK: Department of  
Health, 2003.
- 694 4. Rapley G, Murkett T. *Baby-Led Weaning: Helping your child love good food*.  
London: Vermilion, 2008.
- 696 5. Rapley G. Baby-led weaning: transitioning to solid foods at the baby's own  
pace. *Community Pract* 2011;84(6):20-23.
- 698 6. Sachs M. Baby-led weaning and current UK recommendations - are they  
compatible? *Matern Child Nutr* 2011;7:1-2.
- 700 7. Wright CM, Cameron K, Tsiaka M, Parkinson KN. Is baby-led weaning  
feasible? When do babies first reach out for and eat finger foods?  
702 *Matern Child Nutr* 2011;7(1):27-33.
- 704 8. Brown A, Lee M. Maternal control of child feeding during the weaning  
period: differences between mothers following a baby-led or standard  
weaning approach. *Matern Child Health J* 2011;15(8):1265-71.
- 706 9. Townsend E, Pitchford N. Baby knows best? The impact of weaning style on  
food preferences and body mass index in early childhood in a case-  
708 controlled sample. *BMJ Open* 2012;2:1.
- 710 10. Abel S, Park J, Tipene-Leach D, Finau S, Lennan M. Infant care practices in  
New Zealand: a cross-cultural qualitative study. *Soc Sci & Med*  
2001;53(9):1135-48.
- 712 11. Campbell ND, Soeken KL, Rankin EAD. Infant Weaning Patterns and  
Related Maternal-Infant Health Outcomes. *Public Health Nurs*  
714 1986;3(1):57-63.
- 716 12. Arden MA. Conflicting influences on UK mothers' decisions to introduce  
solid foods to their infants. *Matern & Child Nutr* 2010;6(2):159-73.
- 718 13. Wright C, Parkinson K, Drewett R. Why are babies weaned early? Data  
from a prospective population based cohort study. *Arch Dis Child*  
2004;89(9):813-16.
- 720 14. Hellings P, Howe C. Assessment of Breastfeeding Knowledge of Nurse  
Practitioners and Nurse-Midwives. *J Midwifery Womens Health*  
722 2000;45(3):264-70.
- 724 15. Freed GL, Clark SJ, Lohr JA, Sorenson JR. Pediatrician involvement in  
breast-feeding promotion: a national study of residents and  
practitioners. *Pediatrics* 1995;96(3 Pt 1):490-4.
- 726 16. Freed GL, Clark SJ, Sorenson J, Lohr JA, Cefalo R, Curtis P. National  
assessment of physicians' breast-feeding knowledge, attitudes,  
728 training, and experience. *JAMA* 1995;273(6):472-6.
- 730 17. Schanler RJ, O'Connor KG, Lawrence RA. Pediatricians' practices and  
attitudes regarding breastfeeding promotion. *Pediatrics*  
1999;103(3):E35.

- 1  
2  
3 732 18. Brown A, Lee M. A descriptive study investigating the use and nature of  
4 baby-led weaning in a UK sample of mothers. *Matern Child Health J*  
5 734 2011;7(1):34-47.  
6  
7 19. Patton MQ. *Qualitative Research and Evaluation Methods*. 3rd ed.  
8 736 Thousand Oaks, California Sage Publications, Inc., 2002.  
9  
10 20. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis.  
11 738 *Qualitative health research* 2005;15(9):1277-88.  
12  
13 21. Kondracki NL, Wellman NS, Amundson DR. Content analysis: review of  
14 740 methods and their applications in nutrition education. *Journal of*  
15 *nutrition education and behavior* 2002;34(4):224-30.  
16  
17 22. Dietitians NZ Paediatric SIG convenor. Dietitians NZ Paediatric Special  
18 Interest Group Newsletter. In: NZDA, editor. May ed, 2010.  
19 744 23. Rowell K and Becker H. baby-led-weaning-or-starting-solids-book-review-  
20 and-nutritionist-weighs-in-with-her-7-month-old-daughter.  
21 746 <http://thefeedingdoctor.com>, 2011.  
22  
23 24. Byard RW, Gallard V, Johnson A, Barbour J, Bonython-Wright B, Bonython-  
24 748 Wright D. Safe feeding practices for infants and young children. *J*  
25 *Paediatr Child Health* 1996;32(4):327-9.  
26  
27 25. Naylor A, Morrow A. *Developmental readiness of normal full term infants to*  
28 752 *progress from exclusive breastfeeding to the introduction of*  
29 *complementary foods: reviews of the relevant literature concerning*  
30 *infant immunologic, gastrointestinal, oral motor and maternal*  
31 *reproductive and lactational development*. Washington DC: Wellstart  
32 International, LINKAGES Project Academy for Educational  
33 756 Development, 2001.  
34  
35 26. Pridham KF. Feeding behavior of 6-to 12-month-old infants: Assessment  
36 758 and sources of parental information. *J Pediatr* 1990;117(2(Pt 2)):S174-  
37 80.  
38  
39 27. Brown A, Lee M. An exploration of experiences of mothers following a  
40 760 baby-led weaning style: developmental readiness for complementary  
41 762 foods. *Matern Child Health J* 2011.  
42  
43 28. Soh P, Ferguson EL, McKenzie JE, Homs MY, Gibson RS. Iron deficiency and  
44 764 risk factors for lower iron stores in 6-24-month-old New Zealanders.  
45 *Eur J Clin Nutr* 2004;58(1):71-79.  
46  
47 29. Domellof M. Iron requirements in infancy. *Ann Nutr Metab* 2011;59(1):59-  
48 766 63.  
49  
50 30. Leong W-I, Lönnerdal B. Iron Nutrition. In: Anderson G, McLaren G,  
51 768 editors. *Iron Physiology and Pathophysiology in Humans*: Humana  
52 Press, 2012:81-99.  
53  
54 31. Kramer MK, R. Optimal duration of exclusive breastfeeding. *Cochrane*  
55 772 *database of systematic reviews* 2002(1):CD003517.  
56  
57 32. World Health Organization. Guiding Principles For Complementary  
58 774 Feeding of the Breastfed Child. Geneva, Switzerland, 2004.  
59  
60 33. Graneheim UH, Lundman B. Qualitative content analysis in nursing  
776 research: concepts, procedures and measures to achieve  
trustworthiness. *Nurse Educ Today* 2004;24(2):105-12.  
778 34. Department of Health. Start4Life: No Rush to Mush.  
<http://www.nhs.uk/start4life/pages/no-rush-to-mush.aspx>, 2009.

- 1  
2  
3 780 35. National Health Service (NHS). Your baby's first solid foods.  
4 <http://www.nhs.uk/Conditions/pregnancy-and-baby/Pages/solid->  
5 782 [foods-weaning.aspx](http://www.nhs.uk/Conditions/pregnancy-and-baby/Pages/solid-): NHS, 2011.  
6  
7  
8 784  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3  
4  
5  
6  
7  
8 Healthcare professionals' and mothers' knowledge of, attitudes to, and  
9  
10 5 experiences with, Baby-Led Weaning: a content analysis study  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34

10 Sonya L Cameron<sup>1</sup>

Anne-Louise M Heath<sup>1</sup>

Rachael W Taylor<sup>2</sup>

25 From the

15 Departments of Human Nutrition<sup>1</sup> and Medicine<sup>2</sup>

University of Otago

Dunedin, New Zealand

20 Address correspondence to:

Name: Anne-Louise M Heath

38 Mailing address: Department of Human Nutrition, University of Otago, PO Box  
39 56, Dunedin, New Zealand 9054

42 Telephone: 64 3 479 8379

44 25 Fax: 64 3 479 7958

46 Email: anne-louise.heath@otago.ac.nz  
47  
48  
49  
50

51 **Key words** Healthcare professionals, mothers, complementary feeding, baby-  
52 30 led weaning.

54 **Word count** = 4609  
55  
56  
57  
58  
59  
60



## ABSTRACT

**Objective:** Baby-Led Weaning (BLW) is an alternative approach for introducing complementary foods to infants that emphasizes infant self-feeding rather than adult spoon-feeding. Here we examined healthcare professionals' and mothers' knowledge of, attitudes to, and experiences with, BLW.

**Design, setting and participants:** Healthcare professionals (n=31) and mothers who had used BLW (n=20) completed a semi-structured interview using one of two tailored interview schedules examining their knowledge of, attitudes to, and experiences with, BLW. Interview notes and transcripts were analysed using content analysis to identify sub-categories and extract illustrative quotes.

**Results:** Healthcare professionals had limited direct experience with BLW and the main concerns raised were the potential for increased risk of choking, iron deficiency, and inadequate energy intake. Although they suggested a number of potential benefits of BLW (greater opportunity for shared family meal times, fewer mealtime battles, healthier eating behaviours, greater convenience, and possible developmental advantages) most felt reluctant to recommend BLW because of their concern about the potential increased risk of choking. By contrast, mothers who had used this style of feeding reported no major concerns with BLW. They considered BLW to be a healthier, more convenient and less stressful way to introduce complementary foods to their infant and recommended this feeding approach to other mothers. Although mothers did not report being concerned about choking, 30% reported at least one choking episode – most commonly with raw apple.

**Conclusion:** Given the lack of research on BLW, further work is needed to determine whether the concerns expressed by healthcare professionals and potential benefits outlined by mothers are valid. The current study suggests healthcare professionals should specifically discourage mothers who plan to use, or are using, BLW from offering raw apple.

65 **ARTICLE SUMMARY**

## 9 Article focus

- 11 • Healthcare professionals are an important source of information for  
12 mothers during the complementary feeding period.
- 14 70 • The literature suggests that there is a mismatch between healthcare  
15 professionals' and mothers' knowledge and attitudes to infant feeding.
- 17 • Baby-Led Weaning (BLW) is an alternative approach for introducing  
18 complementary foods to infants that is becoming increasingly popular  
19 with mothers.

22 75

## 24 Key messages

- 26 • Healthcare professionals identified a number of potential benefits of  
27 BLW including more shared family meals, promotion of healthier  
28 eating behaviours and greater convenience for mothers. However,  
29 healthcare professionals also had strong concerns about the risk of  
30 iron deficiency, inadequate energy intake and choking, and as a result  
31 most felt reluctant to recommend it.
- 32 80 • Mothers who had practised BLW reported more benefits and had  
33 fewer concerns about BLW than healthcare professionals.
- 34 • Healthcare professionals should specifically discourage mothers who  
35 plan to use, or are using, BLW from offering raw apple.

36 85

## 44 Strengths and limitations of this study

- 46 • This is the first study to interview healthcare professionals about BLW.
- 48 90 • The healthcare professionals and mothers were self-selected.

49

## INTRODUCTION

1  
2  
3  
4  
5 92 Traditionally the method of infant feeding recommended to mothers in most  
6 developed countries, including the United Kingdom and New Zealand, has  
7  
8 94 been to spoon-feed the infant puréed food before moving on to mashed and  
9  
10 finger foods as the child grows. [1-3] Recently an alternative approach,  
11  
12 96 known as Baby-Led Weaning (BLW), has emerged [4,5] and anecdotal  
13  
14 evidence suggests that many mothers are attempting BLW. [6] Baby-Led  
15  
16 98 Weaning recommends that instead of spoon-feeding, mothers encourage their  
17  
18 infant to self-feed, from about six months of age. Although infants following  
19  
20 the more traditional method of infant feeding may be offered finger foods, in  
21  
22 100 many countries, including New Zealand, it is recommended that this does not  
23  
24 occur until 8-9 months of age, long after the introduction of puréed food. By  
25  
26 102 contrast, BLW, in its purest form, does not include any spoon-feeding by the  
27  
28 104 adult. The infant is only offered pieces of whole food, appropriately prepared,  
29  
30 so that the infant can feed themselves right from the start of the  
31  
32 106 complementary feeding period.

33  
34 108 The small body of existing research suggests that BLW is feasible for most 6-  
35  
36 month old infants from a motor development point of view. [7] It also  
37  
38 110 suggests that BLW is associated with lower levels of maternal anxiety,  
39  
40 restriction, pressure to eat and monitoring during the complementary feeding  
41  
42 112 period; [8] and perhaps healthier eating patterns and BMI. [9] However, in  
43  
44 the absence of any longitudinal or randomized controlled trial data, it is not  
45  
46 114 possible to determine whether these associations are causal.

47  
48 116 Healthcare professionals are an important source of information for mothers  
49  
50 during the complementary feeding period, and can potentially have as much  
51  
52 118 influence on decisions around milk feeding and introducing solids as cultural  
53  
54 values or material resources. [10,11] However, healthcare professionals'  
55  
56 120 knowledge and attitudes about infant feeding often differ from those of  
57  
58 mothers. [12,13]

59  
60 122

Previous studies on healthcare professionals' knowledge and attitudes

1  
2  
3 124 towards infant feeding have focused on milk feeding or timing of the  
4 introduction of complementary food. [14-17] To date no study has examined  
5  
6 126 attitudes to BLW in healthcare professionals working with young families.  
7  
8

9  
10 128 The aim of this content analysis study was to examine the knowledge of,  
11 attitudes to, and experiences with, BLW of healthcare professionals and of  
12  
13 130 mothers who had used this style of feeding with their infant.  
14

## 15 16 17 132 **METHODS**

### 18 19 **Participants**

20  
21 134 The participants were 31 healthcare professionals who were working with  
22 infants and families, and 20 mothers who had used BLW when introducing  
23  
24 136 solids to their infant. Mothers could be part of the study if they considered  
25 that they had used BLW, so BLW was self-defined.  
26

27 138  
28  
29 Participants were recruited by word of mouth (healthcare professional peer-  
30  
31 140 to-peer networks, parenting groups, La Leche League), email “snowballing”,  
32 or newspaper advertising. Twelve parenting groups were approached as a  
33  
34 142 starting point to recruit directly mothers who had tried BLW and to  
35 commence snowballing. Recruitment of the health professionals was  
36  
37 144 undertaken via established clinical relationships, and via snowballing through  
38 practice nurses. The study was approved by the Human Ethics Committee of  
39  
40 146 the University of Otago, Dunedin, New Zealand.  
41  
42  
43

### 44 148 **Data collection**

45  
46 The data were collected during 2010 in Dunedin, New Zealand. Healthcare  
47  
48 150 professionals were interviewed at their place of work and mothers in their  
49 own home. The same researcher (SC) conducted all interviews, which  
50  
51 152 typically lasted 1 - 1.5 hours.  
52

### 53 54 154 **Interview schedule and process**

55  
56 Two interview schedules, one for health professionals and one for parents,  
57  
58 156 were developed from the existing literature about BLW [7,8,18] and the  
59  
60

1  
2  
3 expert opinion of the authors (Table 1 and Table 2). As some healthcare  
4  
5 158 professionals had not heard of BLW, a brief description of BLW was given at  
6  
7 the start of the interview when necessary.

8  
9 160

10 We used a semi-structured interview as outlined in Patton [19] to include, in  
11  
12 162 the first part, a structured framework to cover the same basic lines of inquiry  
13  
14 around knowledge, attitudes and experiences, for which participants could  
15  
16 164 express their own ideas and understandings. The second part of the interview  
17  
18 followed an unstructured format to allow for probing and further questioning  
19  
20 166 of ideas or individual circumstances that were not included in the original  
21  
22 interview outline.

23  
24 168

#### **Table 1 Questions used in interviews with healthcare professionals**

1. What is your professional role?
2. Have you heard of Baby-led Weaning (BLW)?
3. Where did you hear about BLW?
4. When did you hear about BLW?
5. If somebody asked you what BLW is, how would you describe it?
6. What do you think of BLW as an alternative method for introducing solid foods to infants?
7. Do you consider there may be benefits of BLW?
8. Do you consider there may be disadvantages of BLW?
9. Do you have any concerns about BLW?

25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40 170

#### **Table 2 Questions used in interviews with mothers who had used Baby-Led Weaning**

1. If someone asked you: "What is Baby-Led Weaning (BLW)?" what would you tell them?
2. How did you hear about BLW?
3. Why did you decide to try BLW?
4. How old was your baby when you started BLW?
5. How old is she now?
6. How much of her food do you feed her and how much does she feed herself?
7. Where did/do you get most of your information about BLW?
8. What were the first foods you offered your baby?
9. What form were the foods in that you first offered your baby?
10. Were there any foods you avoided because you were using BLW?

11. Did your baby eat at the same time as the rest of the family?
  12. Do you think your baby is a fussy or picky eater?
  13. Were you worried about BLW in any way?
  14. Did your baby gag on food?
  15. Was it food she had fed herself?
  16. Did your baby ever choke on food?
  17. Was it food she had fed herself?
  18. Do you consider there were advantages of BLW for you and your baby?
  19. Do you consider there were disadvantages of BLW for you and your baby?
  20. Overall, do you think BLW worked for you and your baby?
  21. Would you recommend other mothers try BLW?
  22. Do you have any useful tips for other mothers trying BLW?
- NB: "She" or "he" was used appropriately for the sex of the child.

## 172 Data analysis

174 Field notes were taken during the interviews with healthcare professionals  
175 and extended immediately following the meeting. Interviews with mothers  
176 were tape-recorded and transcribed verbatim. The main lines of inquiry  
177 (knowledge, attitudes and experiences) from the interviews were used as an  
178 initial guide in a directed content analysis [20], and are referred to here as  
179 categories. Content analysis [19] was performed on all interviews by  
180 reviewing all transcripts several times for recurring sub-categories  
181 (reviewing the two groups separately). Sub-categories were identified from  
182 manifest content (the visible, obvious components) [21], because the aim was  
183 to extract and report on the descriptive level of content and not to provide a  
184 deep level of interpretation and underlying meaning. Participants were  
185 recruited until we reached saturation of sub-categories, and we ensured that  
186 sub-categories were, as far as possible, defined so that they were exhaustive  
187 and mutually exclusive. Data analysis was led by one member of the research  
188 team (SC); and interpretation was verified during research team meetings  
189 (with RWT and ALH) to scrutinise sub-categories as they were identified.  
190 Each category and its sub-categories have been summarized, and illustrative  
191 quotes are included.

## 192 RESULTS

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

194 Thirty-one healthcare professionals were interviewed, comprising: practice  
nurses (n=11), Well-Child providers (a government funded service  
supporting families with young children and assessing health status, see:  
196 <http://www.wellchild.org.nz/>) (n=4), dietitians (n=4), general practitioners  
(n=5), paediatricians (n=2), lactation consultants (n=2), midwives (n=2), and  
198 a paediatric Speech-Language Therapist (n=1). The mothers were twenty  
mothers who had a child aged 8 – 24 months (mean=13 months).

200

### Healthcare Professionals

202 The sub-categories that emerged were remarkably consistent across the  
interviews with healthcare professionals.

204

### Knowledge

206 Nearly half (n=13/31) of the healthcare professionals had heard about BLW.  
Most of these had been introduced to the concept by their colleagues or  
208 friends and family (rather than patients). The healthcare professionals who  
knew about BLW described it as the child feeding themselves whole foods,  
210 instead of being spoon-fed purées. There was little discussion of other aspects  
of BLW.

212

### Attitudes

214 All healthcare professionals considered that BLW could be beneficial for the  
family and the child.

216

Healthcare professionals considered that **shared family mealtimes** would be  
218 the main advantage of BLW. They were aware of the nutritional and  
psychological benefits of family meals and they envisaged family mealtimes  
220 would be easier and more pleasant with BLW:

*The best thing is that an adult can eat their meal while the child is  
222 having theirs. There's no juggling trying to feed the baby while shoving a  
spoonful for yourself. (General Practitioner 3)*

224

1  
2  
3 Some healthcare professionals thought **mealtime battles** would be less likely  
4  
5 226 with BLW for two reasons: mothers would have an alternative approach to  
6  
7 try if their child refused to be spoon-fed; and because BLW allows the child to  
8  
9 228 eat at their own pace and stop when they have had enough, they would not be  
10  
11 “bribed” or “forced” to eat food:

12 230 *I think it's healthier that the baby is in control of what they eat... and you*  
13  
14 *aren't forcing them to eat...there's far too many of us who just finish our*  
15 232 *plates instead of stopping when we are full. (Dietitian 2)*  
16  
17

18 234 Overall, healthcare professionals thought BLW would encourage healthier  
19  
20 dietary behaviours by promoting a **wider variety of foods** and allowing the  
21  
22 236 child to explore and learn about food at their own pace:

23  
24 *Being able to look at it, hold it and see it as food, instead of slop must*  
25 238 *have advantages? (Paediatrician 2)*  
26  
27

28 240 They also considered BLW would encourage **better appetite and self-**  
29  
30 **regulation skills**, as mothers would be less able to control the child's food  
31  
32 242 intake. They saw similarities between BLW and breastfeeding on demand  
33  
34 and thought the two would complement each other well.

35 244  
36  
37 A number of healthcare professionals who had children of their own thought  
38  
39 246 BLW would be **more convenient** than the conventional method of spoon-  
40  
41 feeding purées:

42 248 *It sounds so much easier. Making purées is time consuming, and then*  
43  
44 *they hardly eat anything and you have to throw it all out or you buy*  
45 250 *those jars of food, which are really expensive. (Dietitian 4)*  
46  
47

48  
49 252 Healthcare professionals suggested two **developmental advantages**: BLW  
50  
51 might encourage better oral and chewing skills because the child is offered  
52  
53 254 pieces of food to eat so they may have more opportunity to develop their  
54  
55 mouth and jaw movements instead of sucking food from a spoon as they do  
56 256 with purées; and enhanced fine motor skills as the child has greater  
57  
58  
59  
60



1  
2  
3 opportunities to manipulate food with their fingers and practice their fine  
4  
5 258 motor movements:

6  
7 *The BLW method could have real advantages for coping with food and*  
8 260 *learning to eat i.e. for oral development. If babies are fed purées for too*  
9  
10 *long they miss important windows for introducing different food*  
11 262 *textures. (Speech-Language Therapist 1)*

12  
13  
14  
15 264 *There must be some sort of fine motor benefits for baby being able to*  
16 *play, essentially, with its food. (General Practitioner 5)*

17  
18 266  
19  
20 However, in addition to these potential benefits, strong concerns about BLW  
21 268 were also expressed.

22  
23  
24  
25 270 **Choking** was a major concern expressed by many of the healthcare  
26 professionals, particularly those who had not observed BLW. The potential  
27  
28 272 risk of choking meant most healthcare professionals felt reluctant to  
29 recommend BLW:

30  
31  
32 274 *The potential for choking would make me feel very hesitant about giving*  
33 *my child whole food at 6 months. As a health professional I'd need to see*  
34  
35 276 *some sound evidence before I could endorse this method [BLW].*  
36  
37 *(Dietitian 2)*

38 278  
39  
40 The specific concerns voiced regarding choking were that a 6 month old  
41 280 infant would not be developmentally ready to chew whole pieces of food and  
42 that mothers may leave the infant alone in their highchair with their food.  
43  
44 282 Additionally healthcare professionals considered that mothers may become  
45 competitive about their infant's BLW progress, considering that their child is  
46  
47 284 more advanced if they have certain foods or a greater variety of foods earlier  
48 than other children, and therefore might be motivated to offer unsafe foods  
49  
50 that would increase the child's risk of choking:  
51 286

52  
53  
54 *Just give the baby that food, she'll be fine. Sometimes it's almost like a*  
55 288 *challenge to see how they cope, another one of those competitive*  
56  
57  
58  
59  
60

parenting things...oh look she's eating raw carrot at age 6 months.

290 (Dietitian 1)

292 However, one healthcare professional considered that BLW may work well  
for parents whose infant experiences feeding problems when spoon-feeding  
294 is used:

296 *I know of similar feeding methods which are often used with children  
whose parents are having feeding difficulties with spoon-feeding and  
these can work very well. (Speech-Language Therapist 1)*

298

Healthcare professionals considered that there were two possible dietary  
300 disadvantages with BLW: the potential for **growth faltering**, and for **poor  
iron status**. There was concern that adopting BLW would mean forgoing any  
302 iron-fortified infant cereal, and that a BLW diet would comprise low-energy  
low-iron fruits and vegetables and include very few iron-rich foods. In  
304 addition to low-energy foods, clumsy self-feeding (particularly at the  
beginning of BLW) might lead to growth faltering.

306 *"The two parents I know who have chosen BLW are offering only fruits  
and vegetables...Although fruits and vegetables are great foods, babies  
308 need more nutrients... So I wonder how they would get these [nutrients]  
if they were only having fruits and vege...nutrients could be limited..."*  
310 (General Practitioner 1)

312 Contrasting this, a few healthcare professionals thought BLW infants could  
consume energy beyond their needs as a result of **poor food choices**:

314 *Young children arrive here and they're under two eating twisties [an  
extruded cereal snack], chocolate biscuits - would BLW be that for some  
316 mothers? (Practice Nurse 2)*

318 At the other extreme, some healthcare professionals commented that mothers  
(especially first-time mothers) are often apprehensive about their infant's  
320 growth and compare it to that of other infants and that a "chubby" or "bonny"  
baby is viewed as healthy even when it reflects overweight or obesity. Some

1  
2  
3 322 healthcare professionals suggested BLW may **increase parental anxiety**.  
4 They thought mothers would struggle watching their infant learn to eat,  
5  
6 324 especially at the start when they might eat very little:

7  
8 *Parents expect to see their child growing consistently - linear growth -*  
9  
10 326 *and if they do not this evokes anxiety. How would you know if the child*  
11 *was eating enough? Parents would not cope with the child playing with*  
12 *food and not eating it. (Practice Nurse 7)*  
13 328

14  
15  
16  
17 330 Finally, some healthcare professionals thought BLW would be **messy** and for  
18 the mothers and suggested that there would be a lot of food wasted, which  
19  
20 332 many mothers would not tolerate:

21  
22 *I could imagine in the first couple of weeks that the infant wouldn't eat*  
23 334 *much and that there would be an awful lot of playing and squashing.*  
24  
25 *Some mothers may not be able to cope with this. (Practice Nurse 11)*  
26

27 336  
28  
29 *I would be concerned about the mess and wastage of food. Some of our*  
30 338 *families live on a very tight food budget and I've seen the mess when*  
31 *doing BLW and I think a lot of food gets wasted." (Well Child Provider 1)*  
32  
33 340

## 34 35 36 37 342 **Mothers**

38  
39 The sub-categories that emerged were very consistent across the interviews  
40 344 with mothers.

41  
42  
43 346 Most mothers (n=18/20) started BLW when their child was 5.5 - 6 months of  
44 age and all mothers had exclusively breastfed their child up until this age. The  
45  
46  
47 348 BLW approach advises mothers to watch for signs of developmental  
48 readiness before introducing their child to solid food. However most mothers  
49  
50 350 recalled starting solids at an age based on advice from their healthcare  
51 professional or because they were following the WHO guidelines, although a  
52  
53 352 small number (n=2/20) of mothers started solids when their infant started  
54 reaching out for food.  
55  
56

57 354  
58  
59  
60

1  
2  
3 The most commonly offered first foods were vegetables (steamed or boiled  
4 356 pumpkin, potato, kumara (New Zealand sweet potato), broccoli, carrot)  
5  
6 (n=13/20) and fruit (avocado, banana) (n=11/20). Most mothers (n=16/20)  
7  
8 358 reported that their child shared every meal with one or more family  
9  
10 members. Mothers liked that their child could feed themselves with BLW,  
11  
12 360 however many (n=15/20) also reported some spoon-feeding, although this  
13  
14 was infrequent or only in unusual circumstances, such as when their child  
15  
16 362 was sick. Mothers reported doing this to avoid mess, to increase iron intake  
17  
18 by spoon-feeding iron-fortified infant cereal, or to increase energy intake  
19  
20 especially when their infant was sick or appeared too tired to self-feed.

### 21 366 **Knowledge**

22  
23 The majority of mothers defined BLW as having 3 main components: offering  
24  
25 368 finger-sized pieces of food, allowing the child to be in control of how much  
26  
27 they ate, and not spoon-feeding purées:

28 370 *Letting your baby lead in terms of the pace and amount of solids*  
29  
30 *eaten...offering them whole, safe foods when they are physically ready to*  
31  
32 372 *feed themselves... keeping milk [breast/formula] as their main food*  
33  
34 *source until they naturally increase the amount they eat and drop milk*  
35  
36 374 *feeds on their own. (Mother 2)*

37  
38  
39 376 Nearly half of the mothers first heard about BLW through a parenting group  
40  
41 while others had discovered it online or were told about it by their Well-Child  
42  
43 378 provider. One mother had not heard of the term “Baby-Led Weaning” but said  
44  
45 “*it was instinctive*” to offer her child pieces of food and allow them to feed  
46  
47 380 themselves. The majority of mothers obtained their BLW information from  
48  
49 online sources, drawing on other mothers’ experiences through blogs, threads  
50  
51 382 and forums.

### 52 384 **Attitudes**

53  
54 The main reason mothers chose to follow BLW was because it “*made sense*”  
55  
56 386 and “*seemed logical*”. Lifestyle reasons also motivated mothers to follow  
57  
58  
59  
60

1  
2  
3 BLW. They considered that BLW was **less time consuming** and **less**  
4 **expensive** than making puréed food:

5  
6 *With three other children, I was way too busy to prepare special foods i.e.*  
7 *purées and also I didn't want to buy them - they're expensive. (Mother*  
8 *15)*

9  
10  
11 392

12  
13 Mothers considered that there were advantages of BLW during the  
14 complementary feeding period, and also in the future. During the  
15 complementary feeding period, mothers reported **less meal preparation**  
16 (the baby ate what the family was eating, there was no purée preparation)  
17 and **reduced mealtime stress** because they were not spoon-feeding the baby  
18 and eating their own meal simultaneously. Some mothers (n=6/20) reported  
19 it was liberating that BLW does not include a detailed step-by-step weaning  
20 protocol and instead **promotes responding to the infant** and thought that  
21 fewer "rules" made the **transition to food less frightening and**  
22 **complicated:**

23  
24  
25 *With my first child I became so worried about getting the food*  
26 *[purées] to exactly the right consistency. It [BLW] made sense to me,*  
27 *because she was demand fed so it seemed like the natural*  
28 *progression. (Mother 8)*

29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39 408 In addition mothers believed that BLW had encouraged their child to develop  
40 healthier eating behaviours, for example being **able to respond**  
41 **appropriately to hunger and satiety cues**, sharing **family meals** and eating  
42 a **wider variety of foods:**

43  
44  
45 *I felt it would give my daughter the opportunity to experience, from the*  
46 *outset, everything that is pleasurable about food, the textures, colours,*  
47 *individual tastes...a lovely way to have them be a real participant in the*  
48 *meal - eating what we eat, copying us, and really joining in...not being*  
49 *fed separately. (Mother 2)*

50  
51  
52  
53  
54  
55  
56 418 Most mothers had no concerns with BLW (n=15/20). Those mothers who did  
57 have concerns were worried about the appropriateness of certain foods, for  
58  
59  
60

1  
2  
3 420 example raw apple. Current guidelines on types of BLW foods to offer are  
4 incomplete and some mothers reported **not knowing what foods to offer** at  
5  
6 422 what age:

7  
8 *I wasn't worried but a bit concerned that some of the advice was*  
9  
10 424 *conflicting e.g. the book says apple is fine and people I've spoken to who*  
11 *have used BLW have said no apples. (Mother 7)*  
12

426

13  
14 One mother was concerned about her infant's **iron intake**, so she spoon-fed  
15  
16 428 her infant iron fortified rice cereal daily while following BLW. Other mothers  
17 felt that the iron from breast milk would be adequate until the infant started  
18  
19 eating high iron meat or meat alternatives:  
20 430

21 *Solids are just a taste and texture thing, breast milk or formula being*  
22 *their main nutrition until 9 months, so don't worry if your baby takes*  
23 432 *their time adjusting to solids. (Mother 6)*  
24  
25

434

26  
27  
28 Nearly all mothers (n=19/20) reported that their infant gagged on food. Some  
29  
30 436 mothers had completed a first aid course prior to their infant starting BLW to  
31 equip themselves for dealing with gagging or choking. **Gagging was not a**  
32  
33 438 **concern** to mothers, instead they considered it was a natural part of a child  
34 learning to eat and adapting to new textures that are quite different to milk.  
35  
36 Mothers were aware that an infant's gag reflex is much further forward on  
37 440 their tongue when they first start eating and because of this, they understood  
38  
39 gagging was highly likely:  
40 442

41  
42 *I felt like I was really prepared, I had read the book [4] so knew about*  
43 444 *gagging and choking and that mostly it is gagging because the baby's*  
44 *gag reflex is much further forward than an adult's...gagging is a very*  
45 *important learning process. (Mother 12)*  
46  
47 446

48  
49 Mothers viewed gagging as an innate safety mechanism that is activated when  
50  
51 448 food has not been sufficiently chewed for swallowing. One parent explained  
52 that gagging returned the food to the front of the mouth for further chewing  
53  
54 450 and that if the infant did not gag then the food could cause obstruction and  
55 possibly choking.  
56

452

1  
2  
3 Mothers were aware **choking** was a common criticism of BLW, and although  
4  
5 454 most reported that choking did not occur, 30% (n=6/20) reported one or  
6  
7 more episodes. Although choking can be very serious, all mothers who  
8  
9 456 reported choking (n=6/20) reported that the infant independently dealt with  
10  
11 the choking by expelling the food from their mouth through coughing and  
12  
13 458 mothers did not have to intervene with first aid. All mothers who could recall  
14  
15 the food that was responsible (n=4/6) reported that raw apple was the food  
16  
17 460 their infant had choked on. Mothers expressed feeling more relaxed around  
18  
19 462 four weeks after introducing complementary foods; they saw that their infant  
20  
21 could manage different textures, and was developing more coordinated eating  
22  
23 464 skills. Mothers also felt that by this time the difference between gagging and  
24  
25 choking was more obvious and that they realised it was mostly gagging.

26  
27 466 Many of the mothers reported that **mealtime mess** was the main  
28  
29 disadvantage of BLW. Infants were able to pick up their food and “squash,  
30  
31 468 smear and throw it”. Some mothers were apprehensive about their infant  
32  
33 eating in public or at other people’s homes because of the mess. Mess was  
34  
35 470 more of a problem in the early phases of BLW when the infant had not  
36  
37 mastered the coordination skills needed to get food to their mouth, and  
38  
39 472 mothers said as the level of skill improved the mess declined. Mothers who  
40  
41 also had experience with the conventional method of starting solids thought  
42  
43 474 finger foods and self-feeding were messy whatever the age:

44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56 476 *As someone who’s done it both ways [BLW and spoon-feeding], I think*  
57  
58 *they’re both pretty messy and wasteful! (Mother 5)*

59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100  
101  
102  
103  
104  
105  
106  
107  
108  
109  
110  
111  
112  
113  
114  
115  
116  
117  
118  
119  
120  
121  
122  
123  
124  
125  
126  
127  
128  
129  
130  
131  
132  
133  
134  
135  
136  
137  
138  
139  
140  
141  
142  
143  
144  
145  
146  
147  
148  
149  
150  
151  
152  
153  
154  
155  
156  
157  
158  
159  
160  
161  
162  
163  
164  
165  
166  
167  
168  
169  
170  
171  
172  
173  
174  
175  
176  
177  
178  
179  
180  
181  
182  
183  
184  
185  
186  
187  
188  
189  
190  
191  
192  
193  
194  
195  
196  
197  
198  
199  
200  
201  
202  
203  
204  
205  
206  
207  
208  
209  
210  
211  
212  
213  
214  
215  
216  
217  
218  
219  
220  
221  
222  
223  
224  
225  
226  
227  
228  
229  
230  
231  
232  
233  
234  
235  
236  
237  
238  
239  
240  
241  
242  
243  
244  
245  
246  
247  
248  
249  
250  
251  
252  
253  
254  
255  
256  
257  
258  
259  
260  
261  
262  
263  
264  
265  
266  
267  
268  
269  
270  
271  
272  
273  
274  
275  
276  
277  
278  
279  
280  
281  
282  
283  
284  
285  
286  
287  
288  
289  
290  
291  
292  
293  
294  
295  
296  
297  
298  
299  
300  
301  
302  
303  
304  
305  
306  
307  
308  
309  
310  
311  
312  
313  
314  
315  
316  
317  
318  
319  
320  
321  
322  
323  
324  
325  
326  
327  
328  
329  
330  
331  
332  
333  
334  
335  
336  
337  
338  
339  
340  
341  
342  
343  
344  
345  
346  
347  
348  
349  
350  
351  
352  
353  
354  
355  
356  
357  
358  
359  
360  
361  
362  
363  
364  
365  
366  
367  
368  
369  
370  
371  
372  
373  
374  
375  
376  
377  
378  
379  
380  
381  
382  
383  
384  
385  
386  
387  
388  
389  
390  
391  
392  
393  
394  
395  
396  
397  
398  
399  
400  
401  
402  
403  
404  
405  
406  
407  
408  
409  
410  
411  
412  
413  
414  
415  
416  
417  
418  
419  
420  
421  
422  
423  
424  
425  
426  
427  
428  
429  
430  
431  
432  
433  
434  
435  
436  
437  
438  
439  
440  
441  
442  
443  
444  
445  
446  
447  
448  
449  
450  
451  
452  
453  
454  
455  
456  
457  
458  
459  
460  
461  
462  
463  
464  
465  
466  
467  
468  
469  
470  
471  
472  
473  
474  
475  
476  
477  
478  
479  
480  
481  
482  
483  
484  
485  
486  
487  
488  
489  
490  
491  
492  
493  
494  
495  
496  
497  
498  
499  
500  
501  
502  
503  
504  
505  
506  
507  
508  
509  
510  
511  
512  
513  
514  
515  
516  
517  
518  
519  
520  
521  
522  
523  
524  
525  
526  
527  
528  
529  
530  
531  
532  
533  
534  
535  
536  
537  
538  
539  
540  
541  
542  
543  
544  
545  
546  
547  
548  
549  
550  
551  
552  
553  
554  
555  
556  
557  
558  
559  
560  
561  
562  
563  
564  
565  
566  
567  
568  
569  
570  
571  
572  
573  
574  
575  
576  
577  
578  
579  
580  
581  
582  
583  
584  
585  
586  
587  
588  
589  
590  
591  
592  
593  
594  
595  
596  
597  
598  
599  
600  
601  
602  
603  
604  
605  
606  
607  
608  
609  
610  
611  
612  
613  
614  
615  
616  
617  
618  
619  
620  
621  
622  
623  
624  
625  
626  
627  
628  
629  
630  
631  
632  
633  
634  
635  
636  
637  
638  
639  
640  
641  
642  
643  
644  
645  
646  
647  
648  
649  
650  
651  
652  
653  
654  
655  
656  
657  
658  
659  
660  
661  
662  
663  
664  
665  
666  
667  
668  
669  
670  
671  
672  
673  
674  
675  
676  
677  
678  
679  
680  
681  
682  
683  
684  
685  
686  
687  
688  
689  
690  
691  
692  
693  
694  
695  
696  
697  
698  
699  
700  
701  
702  
703  
704  
705  
706  
707  
708  
709  
710  
711  
712  
713  
714  
715  
716  
717  
718  
719  
720  
721  
722  
723  
724  
725  
726  
727  
728  
729  
730  
731  
732  
733  
734  
735  
736  
737  
738  
739  
740  
741  
742  
743  
744  
745  
746  
747  
748  
749  
750  
751  
752  
753  
754  
755  
756  
757  
758  
759  
760  
761  
762  
763  
764  
765  
766  
767  
768  
769  
770  
771  
772  
773  
774  
775  
776  
777  
778  
779  
780  
781  
782  
783  
784  
785  
786  
787  
788  
789  
790  
791  
792  
793  
794  
795  
796  
797  
798  
799  
800  
801  
802  
803  
804  
805  
806  
807  
808  
809  
810  
811  
812  
813  
814  
815  
816  
817  
818  
819  
820  
821  
822  
823  
824  
825  
826  
827  
828  
829  
830  
831  
832  
833  
834  
835  
836  
837  
838  
839  
840  
841  
842  
843  
844  
845  
846  
847  
848  
849  
850  
851  
852  
853  
854  
855  
856  
857  
858  
859  
860  
861  
862  
863  
864  
865  
866  
867  
868  
869  
870  
871  
872  
873  
874  
875  
876  
877  
878  
879  
880  
881  
882  
883  
884  
885  
886  
887  
888  
889  
890  
891  
892  
893  
894  
895  
896  
897  
898  
899  
900  
901  
902  
903  
904  
905  
906  
907  
908  
909  
910  
911  
912  
913  
914  
915  
916  
917  
918  
919  
920  
921  
922  
923  
924  
925  
926  
927  
928  
929  
930  
931  
932  
933  
934  
935  
936  
937  
938  
939  
940  
941  
942  
943  
944  
945  
946  
947  
948  
949  
950  
951  
952  
953  
954  
955  
956  
957  
958  
959  
960  
961  
962  
963  
964  
965  
966  
967  
968  
969  
970  
971  
972  
973  
974  
975  
976  
977  
978  
979  
980  
981  
982  
983  
984  
985  
986  
987  
988  
989  
990  
991  
992  
993  
994  
995  
996  
997  
998  
999  
1000

478 Some mothers recalled feeling impatient during the first month of BLW as  
479 their infant, while learning to eat, could spend **long periods of time at the**  
480 **table** and appear to be “*playing with food*”. Additionally mothers reported  
481 that **some family meals were not appropriate** for their baby and that at  
482 these times knowing what to offer the infant was a challenge:

483  
484  
485  
486  
487  
488  
489  
490  
491  
492  
493  
494  
495  
496  
497  
498  
499  
500  
501  
502  
503  
504  
505  
506  
507  
508  
509  
510  
511  
512  
513  
514  
515  
516  
517  
518  
519  
520  
521  
522  
523  
524  
525  
526  
527  
528  
529  
530  
531  
532  
533  
534  
535  
536  
537  
538  
539  
540  
541  
542  
543  
544  
545  
546  
547  
548  
549  
550  
551  
552  
553  
554  
555  
556  
557  
558  
559  
560  
561  
562  
563  
564  
565  
566  
567  
568  
569  
570  
571  
572  
573  
574  
575  
576  
577  
578  
579  
580  
581  
582  
583  
584  
585  
586  
587  
588  
589  
590  
591  
592  
593  
594  
595  
596  
597  
598  
599  
600  
601  
602  
603  
604  
605  
606  
607  
608  
609  
610  
611  
612  
613  
614  
615  
616  
617  
618  
619  
620  
621  
622  
623  
624  
625  
626  
627  
628  
629  
630  
631  
632  
633  
634  
635  
636  
637  
638  
639  
640  
641  
642  
643  
644  
645  
646  
647  
648  
649  
650  
651  
652  
653  
654  
655  
656  
657  
658  
659  
660  
661  
662  
663  
664  
665  
666  
667  
668  
669  
670  
671  
672  
673  
674  
675  
676  
677  
678  
679  
680  
681  
682  
683  
684  
685  
686  
687  
688  
689  
690  
691  
692  
693  
694  
695  
696  
697  
698  
699  
700  
701  
702  
703  
704  
705  
706  
707  
708  
709  
710  
711  
712  
713  
714  
715  
716  
717  
718  
719  
720  
721  
722  
723  
724  
725  
726  
727  
728  
729  
730  
731  
732  
733  
734  
735  
736  
737  
738  
739  
740  
741  
742  
743  
744  
745  
746  
747  
748  
749  
750  
751  
752  
753  
754  
755  
756  
757  
758  
759  
760  
761  
762  
763  
764  
765  
766  
767  
768  
769  
770  
771  
772  
773  
774  
775  
776  
777  
778  
779  
780  
781  
782  
783  
784  
785  
786  
787  
788  
789  
790  
791  
792  
793  
794  
795  
796  
797  
798  
799  
800  
801  
802  
803  
804  
805  
806  
807  
808  
809  
810  
811  
812  
813  
814  
815  
816  
817  
818  
819  
820  
821  
822  
823  
824  
825  
826  
827  
828  
829  
830  
831  
832  
833  
834  
835  
836  
837  
838  
839  
840  
841  
842  
843  
844  
845  
846  
847  
848  
849  
850  
851  
852  
853  
854  
855  
856  
857  
858  
859  
860  
861  
862  
863  
864  
865  
866  
867  
868  
869  
870  
871  
872  
873  
874  
875  
876  
877  
878  
879  
880  
881  
882  
883  
884  
885  
886  
887  
888  
889  
890  
891  
892  
893  
894  
895  
896  
897  
898  
899  
900  
901  
902  
903  
904  
905  
906  
907  
908  
909  
910  
911  
912  
913  
914  
915  
916  
917  
918  
919  
920  
921  
922  
923  
924  
925  
926  
927  
928  
929  
930  
931  
932  
933  
934  
935  
936  
937  
938  
939  
940  
941  
942  
943  
944  
945  
946  
947  
948  
949  
950  
951  
952  
953  
954  
955  
956  
957  
958  
959  
960  
961  
962  
963  
964  
965  
966  
967  
968  
969  
970  
971  
972  
973  
974  
975  
976  
977  
978  
979  
980  
981  
982  
983  
984  
985  
986  
987  
988  
989  
990  
991  
992  
993  
994  
995  
996  
997  
998  
999  
1000

*I struggled with the “baby eats what the family eats” concept... Most of  
what we really eat has a lot of salt, sugar, sauces, etc in it, and it takes*

1  
2  
3 *work to think of how to adjust it or intervene in the cooking process to fit*  
4  
5 486 *baby. (Mother 5)*  
6  
7

8 488 Mothers recalled encountering both positive and negative experiences during  
9 the BLW period, however all the mothers concluded that they would  
10  
11 490 recommend BLW to other mothers:

12  
13 *I couldn't imagine any other way of introducing solids and will certainly*  
14 492 *do BLW with any future children. I think the fact that our son has*  
15 *control over eating means that he doesn't have to fight for control...food*  
16 494 *is not a battleground here. (Mother 19)*  
17  
18  
19

20  
21 496 Two mothers added that they would recommend supplementing BLW with  
22 some spoon-feeding for reassurance about nutrients:  
23

24 498 *I say to people to use a combination. I felt good about this because she*  
25 *was able to explore food and learn about it but at the same time get the*  
26 500 *nutrients that she needed. (Mother 15)*  
27  
28  
29  
30

## 31 502 **Experiences**

32 Table 3 presents practical recommendations mothers offered for overcoming  
33  
34 504 challenges when using BLW.  
35  
36  
37  
38  
39

40 506

**Table 3 Practical recommendations from mothers for successful Baby-Led Weaning**

Practical recommendation	Supporting quote
Place a large cloth under the infant's highchair to collect spilled food - the cloth could be shaken outside and washed in the machine.	<i>"Prepare for mess with bibs, strip the child, messy mats, have a washcloth handy, a hungry dog to eat scraps helps too and then relax and let them go for it."</i>
Use full cover (sweatshirt) bibs.	
In the warmer (summer) months the family could try eating outside.	



<p>Put the infant in their highchair with their nappy on. Then follow with a bath to wash off any food mess.</p>	
<p>Put infant in the highchair in the kitchen so they can begin their meal while the family meal is being prepared and interact with them while they are eating.</p>	<p><i>"Watch your baby but don't interfere, I wouldn't like someone picking food off my plate and putting it into my mouth because they thought I was eating too slowly. Not to worry too much about quantities – remembering that milk is still on offer."</i></p>
<p>Seek advice from parenting groups and others doing BLW. Collect and share food and recipe ideas.</p>	<p><i>Sometimes you get stuck for ideas of what to offer and talking to others doing BLW can get the creativity going again... It's amazing how many ways there are to cook and present food.</i></p>
<p>Mothers, whether following BLW or not, should complete a first aid course. This should teach the difference between gagging and choking, and can improve confidence for dealing with choking (if it occurs).</p>	<p><i>"Go to a first aid course, preferably one targeted at parents. This will give you confidence to deal with choking if it happens."</i></p>
<p>Have realistic expectations about mess and your infant's eating progress. Mothers need to appreciate that starting solids is a transition period which may last many months.</p>	<p><i>"Don't think that things will be heaps easier in the short-term than the conventional way. A baby with finger food will still need a lot of support, because they'll drop things a lot and need you to pick them up."</i></p>
<p>Try and enjoy the BLW experience by allowing the baby to explore food and have fun with eating.</p>	<p><i>"Don't stress about the quantities they eat, the mess they make or the seemingly frequent gagging episodes."</i></p>

508

## DISCUSSION

510 Although anecdotal reports suggest that the use of BLW is increasing, fewer  
 511 than half of the healthcare professionals in the current study had heard about  
 512 this approach. Those who were aware of BLW had limited knowledge of the  
 513 details and were not aware of all the practices promoted as part of BLW. [4,5]  
 514 Healthcare professionals suggested potential benefits of BLW (greater  
 515 opportunity for shared family meal times, fewer mealtime battles, healthier  
 516 eating behaviours, greater convenience, and possible developmental  
 advantages) but most felt reluctant to recommend it because of their concern

1  
2  
3 518 about the potential increased risk of choking. Most healthcare professionals  
4 had not seen BLW in action and therefore had difficulty understanding how a  
5  
6 520 6-month-old infant could possess the mastication and coordination skills  
7  
8 needed to safely manage whole pieces of food.  
9

522

10  
11 Overall, mothers reported that using BLW had been a positive experience,  
12  
13 524 that they recommended it to other mothers, and would follow it again if they  
14 had another child. Interestingly, many of the mothers in this study did not  
15  
16 526 follow BLW strictly as outlined by Rapley [4]. Although they generally  
17  
18 embraced BLW techniques, many also reported using a small amount of  
19  
20 528 spoon-feeding. This suggests that, in practice, many parents following a BLW  
21  
22 approach are probably somewhere along the continuum of some spoon-  
23  
24 530 feeding to total self-feeding, albeit much more at the latter end. As well as it  
25  
26 being described as the “logical way” to introduce complementary foods,  
27  
28 532 mothers reported that BLW was less time consuming, involved less meal  
29  
30 preparation, caused less stress, and resulted in fewer mealtime battles.  
31  
32 534 Although some mothers struggled with drawn out mealtimes and the food  
33  
34 mess created by the self-feeding infant, these disadvantages did not  
35  
36 536 discourage these mothers from following BLW. Furthermore, mothers who  
37  
38 had previously used the conventional method (spoon-feeding purées) with  
39  
40 538 one of their older children considered both approaches (BLW and  
41  
42 conventional) to be messy.

540

43  
44 Healthcare professionals and mothers’ attitudes toward BLW were similar, in  
45  
46 542 some respects. Both agreed that BLW may promote shared family meals,  
47  
48 reduce mealtime battles, and be more convenient than spoon-feeding purées,  
49  
50 544 they also agreed that the mess produced when an infant self-feeds could be  
51  
52 substantial. Furthermore, both groups considered BLW could encourage  
53  
54 548 healthier eating patterns, including better self-regulation of energy intake.  
55  
56 However, there were some noticeable differences in the attitudes of the two  
57  
58 550 groups, particularly concerning safety and nutrient sufficiency. Healthcare  
59  
60 professionals had serious concerns about potential choking and low iron  
intake, as well as the ability of an infant to self-feed at 6 months. Although

1  
2  
3 some mothers had considered the potential problems raised by healthcare  
4  
5 552 professionals they were not as concerned by these. Moreover, they reported  
6  
7 that these concerns decreased as they followed BLW and their baby appeared  
8  
9 554 happy and healthy.

10  
11 556 The healthcare professionals' concern about a possible increased risk of  
12  
13 choking aligns with opinions expressed by other healthcare professionals.[5]  
14  
15 558 [22,23] Choking is more likely with very hard foods such as raw apple or  
16  
17 round coin-shaped foods such as sausage. [24] Children develop the ability to  
18  
19 560 chew before they develop the ability to hold food in their mouth or to move it  
20  
21 backwards for swallowing. [25] At about 6 months of age, infants develop a  
22  
23 562 munching type oral-motor action; this movement, in conjunction with the  
24  
25 ability to sit unsupported, promotes swallowing of thicker, chunkier pieces of  
26  
27 564 food. [26] The founder of BLW, Gill Rapley, disputes that a healthy 6-month-  
28  
29 old infant would be at increased risk of choking with BLW. [4,5] Rapley  
30  
31 566 acknowledges gagging is common with BLW because at 6 months of age the  
32  
33 baby's gag reflex is further forward on their tongue than it is at 1 year. [5]  
34  
35 568 However, based on her personal observations, Rapley considers choking is  
36  
37 more likely with spoon-feeding because the baby learns to use suction to take  
38  
39 570 the purée from the spoon, which causes food to be taken to the back of the  
40  
41 throat where it is swallowed, encouraging the infant to learn to swallow food  
42  
43 572 without chewing first. [5]

44  
45 574 Interestingly most mothers in the current study were not concerned about  
46  
47 choking. Although some had initial concerns, these quickly diminished when  
48  
49 576 they witnessed how proficient their infant was at bringing food forward and  
50  
51 expelling it out of their mouth if needed, and all mothers felt prepared for  
52  
53 578 dealing with a choking incident if it happened. Others have reported similar  
54  
55 findings with mothers following BLW initially being concerned about choking  
56  
57 580 but over time becoming less nervous and more able to distinguish between  
58  
59 the action of gagging to move food and actual choking. [27] Furthermore  
60  
582 93.5% of the BLW group in the recent study by Townsend and Pitchford[9]  
reported never having experienced a choking incident. It is of concern,

1  
2  
3 584 however, that in the current study, 30% of mothers reported at least one  
4 choking incident, most with raw apple. No serious incidents were reported  
5  
6 586 and this raises the question of whether mothers correctly identified choking  
7  
8 or whether they had instead witnessed the less serious action of gagging.  
9  
10 588 However, given that raw apple was the cause of most reported choking  
11 incidents, and fulfills the criteria of a high-risk food, being hard and in small  
12 pieces when bitten, it would be sensible to discourage parents who are  
13 590 following BLW from offering raw apple to their infant.  
14  
15  
16

17 592  
18 Healthcare professionals expressed concern about whether BLW infants  
19  
20 594 would be able to consume sufficient iron. In New Zealand, spoon-feeding iron-  
21 fortified baby rice cereal is a popular way for mothers to increase their  
22  
23 596 infant's iron intake. Healthcare professionals in this study quickly recognized  
24 that this would not be possible with BLW and they speculated that this would  
25  
26 598 put the infant at risk of suboptimal iron status, which is already a concern for  
27 many New Zealand infants (6.9% having iron deficiency anaemia, and a  
28  
29 600 further 12.5% having suboptimal iron status[28]). Most mothers in the  
30 present study believed that the breast milk their infant was receiving would  
31  
32 602 supply enough iron until meat or other high-iron meat alternatives were  
33 introduced. Similarly, mothers from Brown and Lee[27] were not concerned  
34  
35 604 about iron intake. Although healthy, term, normal birth weight infants are  
36 considered to obtain enough iron from their mother's breast milk and from  
37  
38 606 the redistribution of iron from haemoglobin to iron stores during the first six  
39 months of life, [29] from six months of age, iron becomes a critical nutrient  
40  
41 608 and all infants should receive iron-rich complementary foods such as meat,  
42 meat alternatives or iron-fortified foods. [2,29] [30-32]  
43  
44  
45  
46

47 610  
48  
49 Many of the healthcare professionals were not convinced that a 6-month old  
50  
51 612 infant could eat enough to keep pace with growth when self-feeding,  
52 particularly in the early days of complementary feeding. Only one study  
53  
54 614 appears to have examined this, and suggested that there may be an increased  
55 incidence of underweight in BLW children (3/63) compared to spoon-fed  
56  
57 616 children (0/63), although most children were of normal weight, and as  
58  
59  
60

1  
2  
3 acknowledged by the authors, the numbers were small, and the cases and  
4  
5 618 controls drawn from different populations. It has been suggested that purées  
6  
7 (which are frequently made of fruit or vegetables and thinned down with  
8  
9 620 water or milk) are often very low in energy, meaning that the small volume of  
10  
11 purées typically consumed in the early weeks would contribute relatively  
12  
13 622 little to meeting a conventionally fed infant's nutrient requirements. [7] In  
14  
15 contrast, finger foods, if carefully chosen, can be very nutrient dense, so an  
16  
17 624 infant who appears to be eating little when self-feeding may potentially be  
18  
19 closer to meeting their nutrient requirements. [7] Only one parent in the  
20  
21 626 current study reported being concerned about her child being able to eat  
22  
23 enough, although many mothers reported spoon-feeding their infant at times  
24  
25 628 when they were potentially at greater risk of under eating, i.e. when they  
26  
27 were unwell or very tired. Because of the nature of this self-selected sample it  
28  
29 is possible that mothers with concerns about this issue may have  
30  
31 discontinued or chosen not to follow BLW. At this point, no research has  
32  
33 examined the actual food and nutrient intake of children following a BLW  
34  
35 approach compared with a more traditional method of infant feeding.  
36  
37 630  
38  
39 634

33  
34 The healthcare professionals and mothers who took part in the current study  
35  
36 636 were self-selected. Furthermore, the sample size was small. Although this  
37  
38 study is not intended to present representative results given its qualitative  
39  
40 638 nature, participants were recruited in a number of different ways, and the  
41  
42 interviews were continued until well after saturation for both healthcare  
43  
44 640 professionals and mothers, suggesting that the majority of views of BLW in  
45  
46 these groups are likely to have been captured. The first author conducted the  
47  
48 642 content analysis of the transcripts, and although the co-authors discussed the  
49  
50 interpretation of individual participant quotes, they did not conduct a  
51  
52 644 separate full analysis of the transcripts. However, we consider that this was  
53  
54 sufficient to ensure that the findings are trustworthy, both because our aim  
55  
56 646 was to capture manifest (i.e. description of the visible, obvious components),  
57  
58 rather than latent (i.e. interpretation of underlying meaning) content [33], and  
59  
60 648 because we have provided direct participant quotes for each sub-category so  
that the reader can judge for themselves the appropriateness of the coding.

650

Although there was some agreement between healthcare professionals and mothers that BLW was likely to lead to more shared family meals, fewer mealtime battles, potentially healthier eating patterns, and to be more convenient, although messy, the healthcare professionals were, overall, reluctant to recommend the method. They were concerned that BLW could potentially increase choking and adversely affect the infant's iron status and energy intake. In this context, it is interesting that the UK Department of Health has supported the inclusion of some hand-held first foods in their most recent recommendations for infant feeding. [34,35] Undoubtedly, further research of BLW is warranted especially concerning its potential to positively influence eating behaviours, as well as its safety and nutrient sufficiency. In the meantime, the current study suggests that healthcare professionals should specifically discourage mothers who plan to use, or are using, BLW from offering raw apple.

**Acknowledgements** We would like to thank all the families and healthcare professionals who contributed to this study.

**Contributors** SC, ALH and RWT were all involved with the conception and design of the study, the analysis and interpretation of the data and the writing and editing of this paper. SC conducted the interviews with participants and was responsible for the analysis and interpretation of the data. SC wrote the first draft of the paper, and A-L H and RWT made important intellectual contributions to the content and approved the final version.

**Funding** This research was conducted using the authors' (RWT) resources and received no specific grant from any funding agency in the public, commercial or non-profit sectors.

**Competing interests** None.

**Ethical approval** Ethical approval was obtained from the University of Otago Ethics Committee.

**Provenance and peer review** Not commissioned.

**Data sharing statement** No additional data are available.

682

## REFERENCES

- 684
- 686 1. World Health Organization. Infant and young child feeding: model chapter  
for textbooks for medical students and allied health professionals.  
688 Geneva, Switzerland: World Health Organization, 2009.
- 690 2. Ministry of Health. *Food and Nutrition Guidelines for Healthy Infants and  
Toddlers (Aged 0-2): A background paper (4th Ed)*. Wellington: Ministry  
of Health, 2008.
- 692 3. Department of Health (DoH). *Infant Feeding*. London, UK: Department of  
Health, 2003.
- 694 4. Rapley G, Murkett T. *Baby-Led Weaning: Helping your child love good food*.  
London: Vermilion, 2008.
- 696 5. Rapley G. Baby-led weaning: transitioning to solid foods at the baby's own  
pace. *Community Pract* 2011;84(6):20-23.
- 698 6. Sachs M. Baby-led weaning and current UK recommendations - are they  
compatible? *Matern Child Nutr* 2011;7:1-2.
- 700 7. Wright CM, Cameron K, Tsiaka M, Parkinson KN. Is baby-led weaning  
feasible? When do babies first reach out for and eat finger foods?  
702 *Matern Child Nutr* 2011;7(1):27-33.
- 704 8. Brown A, Lee M. Maternal control of child feeding during the weaning  
period: differences between mothers following a baby-led or standard  
weaning approach. *Matern Child Health J* 2011;15(8):1265-71.
- 706 9. Townsend E, Pitchford N. Baby knows best? The impact of weaning style on  
food preferences and body mass index in early childhood in a case-  
708 controlled sample. *BMJ Open* 2012;2:1.
- 710 10. Abel S, Park J, Tipene-Leach D, Finau S, Lennan M. Infant care practices in  
New Zealand: a cross-cultural qualitative study. *Soc Sci & Med*  
2001;53(9):1135-48.
- 712 11. Campbell ND, Soeken KL, Rankin EAD. Infant Weaning Patterns and  
Related Maternal-Infant Health Outcomes. *Public Health Nurs*  
714 1986;3(1):57-63.
- 716 12. Arden MA. Conflicting influences on UK mothers' decisions to introduce  
solid foods to their infants. *Matern & Child Nutr* 2010;6(2):159-73.
- 718 13. Wright C, Parkinson K, Drewett R. Why are babies weaned early? Data  
from a prospective population based cohort study. *Arch Dis Child*  
2004;89(9):813-16.
- 720 14. Hellings P, Howe C. Assessment of Breastfeeding Knowledge of Nurse  
Practitioners and Nurse-Midwives. *J Midwifery Womens Health*  
722 2000;45(3):264-70.
- 724 15. Freed GL, Clark SJ, Lohr JA, Sorenson JR. Pediatrician involvement in  
breast-feeding promotion: a national study of residents and  
practitioners. *Pediatrics* 1995;96(3 Pt 1):490-4.
- 726 16. Freed GL, Clark SJ, Sorenson J, Lohr JA, Cefalo R, Curtis P. National  
assessment of physicians' breast-feeding knowledge, attitudes,  
728 training, and experience. *JAMA* 1995;273(6):472-6.
- 730 17. Schanler RJ, O'Connor KG, Lawrence RA. Pediatricians' practices and  
attitudes regarding breastfeeding promotion. *Pediatrics*  
1999;103(3):E35.

- 1  
2  
3 732 18. Brown A, Lee M. A descriptive study investigating the use and nature of  
4 baby-led weaning in a UK sample of mothers. *Matern Child Health J*  
5 734 2011;7(1):34-47.  
6  
7 19. Patton MQ. *Qualitative Research and Evaluation Methods*. 3rd ed.  
8 736 Thousand Oaks, California Sage Publications, Inc., 2002.  
9  
10 20. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis.  
11 738 *Qualitative health research* 2005;15(9):1277-88.  
12  
13 21. Kondracki NL, Wellman NS, Amundson DR. Content analysis: review of  
14 740 methods and their applications in nutrition education. *Journal of*  
15 *nutrition education and behavior* 2002;34(4):224-30.  
16  
17 22. Dietitians NZ Paediatric SIG convenor. Dietitians NZ Paediatric Special  
18 Interest Group Newsletter. In: NZDA, editor. May ed, 2010.  
19 744 23. Rowell K and Becker H. baby-led-weaning-or-starting-solids-book-review-  
20 and-nutritionist-weighs-in-with-her-7-month-old-daughter.  
21 746 <http://thefeedingdoctor.com>, 2011.  
22  
23 24. Byard RW, Gallard V, Johnson A, Barbour J, Bonython-Wright B, Bonython-  
24 748 Wright D. Safe feeding practices for infants and young children. *J*  
25 *Paediatr Child Health* 1996;32(4):327-9.  
26  
27 25. Naylor A, Morrow A. *Developmental readiness of normal full term infants to*  
28 752 *progress from exclusive breastfeeding to the introduction of*  
29 *complementary foods: reviews of the relevant literature concerning*  
30 *infant immunologic, gastrointestinal, oral motor and maternal*  
31 *reproductive and lactational development*. Washington DC: Wellstart  
32 International, LINKAGES Project Academy for Educational  
33 756 Development, 2001.  
34  
35 26. Pridham KF. Feeding behavior of 6-to 12-month-old infants: Assessment  
36 758 and sources of parental information. *J Pediatr* 1990;117(2(Pt 2)):S174-  
37 80.  
38  
39 27. Brown A, Lee M. An exploration of experiences of mothers following a  
40 760 baby-led weaning style: developmental readiness for complementary  
41 762 foods. *Matern Child Health J* 2011.  
42  
43 28. Soh P, Ferguson EL, McKenzie JE, Homs MY, Gibson RS. Iron deficiency and  
44 764 risk factors for lower iron stores in 6-24-month-old New Zealanders.  
45 *Eur J Clin Nutr* 2004;58(1):71-79.  
46  
47 29. Domellof M. Iron requirements in infancy. *Ann Nutr Metab* 2011;59(1):59-  
48 766 63.  
49  
50 30. Leong W-I, Lönnerdal B. Iron Nutrition. In: Anderson G, McLaren G,  
51 768 editors. *Iron Physiology and Pathophysiology in Humans*: Humana  
52 Press, 2012:81-99.  
53  
54 31. Kramer MK, R. Optimal duration of exclusive breastfeeding. *Cochrane*  
55 772 *database of systematic reviews* 2002(1):CD003517.  
56  
57 32. World Health Organization. Guiding Principles For Complementary  
58 774 Feeding of the Breastfed Child. Geneva, Switzerland, 2004.  
59  
60 33. Graneheim UH, Lundman B. Qualitative content analysis in nursing  
776 research: concepts, procedures and measures to achieve  
trustworthiness. *Nurse Educ Today* 2004;24(2):105-12.  
778 34. Department of Health. Start4Life: No Rush to Mush.  
<http://www.nhs.uk/start4life/pages/no-rush-to-mush.aspx>, 2009.



- 1  
2  
3 780 35. National Health Service (NHS). Your baby's first solid foods.  
4 <http://www.nhs.uk/Conditions/pregnancy-and-baby/Pages/solid->  
5 782 [foods-weaning.aspx](http://www.nhs.uk/Conditions/pregnancy-and-baby/Pages/solid-): NHS, 2011.  
6  
7  
8 784  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study’s design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2,3&4
Objectives	3	State specific objectives, including any prespecified hypotheses	2
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	2&5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	N/A
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5&6
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	6&7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	N/A
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	N/A
		(b) Describe any methods used to examine subgroups and interactions	N/A
		(c) Explain how missing data were addressed	N/A
		(d) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
<b>Results</b>			

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	7
		(b) Indicate number of participants with missing data for each variable of interest	N/A
Outcome data	15*	Report numbers of outcome events or summary measures	N/A
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	N/A
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	17
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	21
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	18-21
Generalisability	21	Discuss the generalisability (external validity) of the study results	21-22
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	22

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).



**Healthcare professionals' and mothers' knowledge of, attitudes to, and experiences with, Baby-Led Weaning: a content analysis study**

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2012-001542.R2
Article Type:	Research
Date Submitted by the Author:	03-Oct-2012
Complete List of Authors:	Cameron, Sonya; University of Otago, Human Nutrition Heath, Anne-Louise; University of Otago, Human Nutrition Taylor, Rachael; University of Otago, Medical and Surgical Sciences
<b>Primary Subject Heading</b>:	Nutrition and metabolism
Secondary Subject Heading:	Paediatrics, General practice / Family practice
Keywords:	NUTRITION & DIETETICS, Community child health < PAEDIATRICS, PRIMARY CARE

SCHOLARONE™  
Manuscripts

1  
2  
3  
4  
5  
6  
7  
8 Healthcare professionals' and mothers' knowledge of, attitudes to, and  
9 experiences with, Baby-Led Weaning: a content analysis study  
10 5

11  
12  
13  
14  
15  
16  
17  
18 10 Sonya L Cameron<sup>1</sup>

19 Anne-Louise M Heath<sup>1</sup>

20 Rachael W Taylor<sup>2</sup>

21  
22  
23  
24  
25 From the

26 15 Departments of Human Nutrition<sup>1</sup> and Medicine<sup>2</sup>

27 University of Otago

28 Dunedin, New Zealand  
29  
30  
31  
32  
33  
34

35 20 Address correspondence to:

36 Name: Anne-Louise M Heath

37 Mailing address: Department of Human Nutrition, University of Otago, PO Box  
38 56, Dunedin, New Zealand 9054

39 Telephone: 64 3 479 8379

40 25 Fax: 64 3 479 7958

41 Email: anne-louise.heath@otago.ac.nz  
42  
43  
44  
45  
46  
47  
48  
49

50 Key words Healthcare professionals, mothers, complementary feeding, baby-  
51 led weaning.  
52 30

53 Word count = 4609  
54  
55  
56  
57  
58  
59  
60

## ABSTRACT

Objective: Baby-Led Weaning (BLW) is an alternative approach for introducing complementary foods to infants that emphasizes infant self-feeding rather than adult spoon-feeding. Here we examined healthcare professionals' and mothers' knowledge of, attitudes to, and experiences with, BLW.

Design, setting and participants: Healthcare professionals (n=31) and mothers who had used BLW (n=20) completed a semi-structured interview using one of two tailored interview schedules examining their knowledge of, attitudes to, and experiences with, BLW. Interview notes and transcripts were analysed using content analysis to identify sub-categories and extract illustrative quotes.

Results: Healthcare professionals had limited direct experience with BLW and the main concerns raised were the potential for increased risk of choking, iron deficiency, and inadequate energy intake. Although they suggested a number of potential benefits of BLW (greater opportunity for shared family meal times, fewer mealtime battles, healthier eating behaviours, greater convenience, and possible developmental advantages) most felt reluctant to recommend BLW because of their concern about the potential increased risk of choking. By contrast, mothers who had used this style of feeding reported no major concerns with BLW. They considered BLW to be a healthier, more convenient and less stressful way to introduce complementary foods to their infant and recommended this feeding approach to other mothers. Although mothers did not report being concerned about choking, 30% reported at least one choking episode – most commonly with raw apple.

Conclusion: Given the lack of research on BLW, further work is needed to determine whether the concerns expressed by healthcare professionals and potential benefits outlined by mothers are valid. The current study suggests there is mismatch between healthcare professionals and parents knowledge of, attitudes to and experiences with BLW.

## ARTICLE SUMMARY

65

## Article focus

- Healthcare professionals are an important source of information for mothers during the complementary feeding period.
- The literature suggests that there is a mismatch between healthcare professionals' and mothers' knowledge and attitudes to infant feeding.
- Baby-Led Weaning (BLW) is an alternative approach for introducing complementary foods to infants that is becoming increasingly popular with mothers.

## 75 Key messages

- Healthcare professionals identified a number of potential benefits of BLW including more shared family meals, promotion of healthier eating behaviours and greater convenience for mothers. However, healthcare professionals also had strong concerns about the risk of iron deficiency, inadequate energy intake and choking, and as a result most felt reluctant to recommend it.
- Mothers who had practised BLW reported more benefits and had fewer concerns about BLW than healthcare professionals.
- Some parents reported offering raw apple to their infant when they were following BLW. This practice should be discouraged because raw apple is a choking hazard at this age.

85

## Strengths and limitations of this study

- This is the first study to interview healthcare professionals about BLW.
- The healthcare professionals and mothers were self-selected.

90

## INTRODUCTION

1  
2  
3  
4  
5 92 Traditionally the method of infant feeding recommended to mothers in most  
6 developed countries, including the United Kingdom and New Zealand, has  
7  
8 94 been to spoon-feed the infant puréed food before moving on to mashed and  
9  
10 finger foods as the child grows. [1-3] Recently an alternative approach,  
11  
12 96 known as Baby-Led Weaning (BLW), has emerged [4,5] and anecdotal  
13  
14 evidence suggests that many mothers are attempting BLW. [6] Baby-Led  
15  
16 98 Weaning recommends that instead of spoon-feeding, mothers encourage their  
17  
18 infant to self-feed, from about six months of age. Although infants following  
19  
20 the more traditional method of infant feeding may be offered finger foods, in  
21  
22 100 many countries, including New Zealand, it is recommended that this does not  
23  
24 occur until 8-9 months of age, long after the introduction of puréed food. By  
25  
26 102 contrast, BLW, in its purest form, does not include any spoon-feeding by the  
27  
28 adult. The infant is only offered pieces of whole food, appropriately prepared,  
29  
30 so that the infant can feed themselves right from the start of the  
31  
32 106 complementary feeding period.

33  
34 108 The small body of existing research suggests that BLW is feasible for most 6-  
35  
36 month old infants from a motor development point of view. [7] It also  
37  
38 110 suggests that BLW is associated with lower levels of maternal anxiety,  
39  
40 restriction, pressure to eat and monitoring during the complementary feeding  
41  
42 112 period; [8] and perhaps healthier eating patterns and BMI. [9] However, in  
43  
44 the absence of any longitudinal or randomized controlled trial data, it is not  
45  
46 114 possible to determine whether these associations are causal.

47  
48 116 Healthcare professionals are an important source of information for mothers  
49  
50 during the complementary feeding period, and can potentially have as much  
51  
52 118 influence on decisions around milk feeding and introducing solids as cultural  
53  
54 values or material resources. [10,11] However, healthcare professionals'  
55  
56 120 knowledge and attitudes about infant feeding often differ from those of  
57  
58 mothers. [12,13]

122

Previous studies on healthcare professionals' knowledge and attitudes



1  
2  
3 124 towards infant feeding have focused on milk feeding or timing of the  
4 introduction of complementary food. [14-17] To date no study has examined  
5  
6 126 attitudes to BLW in healthcare professionals working with young families.  
7  
8

9  
10 128 The aim of this content analysis study was to examine the knowledge of,  
11 attitudes to, and experiences with, BLW of healthcare professionals and of  
12  
13 130 mothers who had used this style of feeding with their infant.  
14

## 15 16 17 132 **METHODS**

### 18 19 Participants

20  
21 134 The participants were 31 healthcare professionals who were working with  
22 infants and families, and 20 mothers who had used BLW when introducing  
23  
24 136 solids to their infant. Mothers could be part of the study if they considered  
25 that they had used BLW, so BLW was self-defined.  
26

27  
28 138  
29 Participants were recruited by word of mouth (healthcare professional peer-  
30  
31 140 to-peer networks, parenting groups, La Leche League), email “snowballing”,  
32 or newspaper advertising. Twelve parenting groups were approached as a  
33  
34 142 starting point to recruit directly mothers who had tried BLW and to  
35 commence snowballing. Parenting groups were SPACE (supporting parenting  
36  
37 144 and child education) groups established to assist mothers (usually first-time  
38 mothers) with all aspects of parenting young children, and were not  
39  
40 146 specifically advocators of BLW, although BLW was a topic addressed through  
41 out the parenting program. Recruitment of the health professionals was  
42  
43 148 undertaken via established clinical relationships, and via snowballing through  
44 practice nurses. The study was approved by the Human Ethics Committee of  
45  
46 150 the University of Otago, Dunedin, New Zealand.  
47  
48

### 49 50 51 152 Data collection

52  
53 The data were collected during 2010 in Dunedin, New Zealand. Healthcare  
54  
55 154 professionals were interviewed at their place of work and mothers in their  
56 own home. The same researcher (SC) conducted all interviews, which  
57  
58 156 typically lasted 1 - 1.5 hours. Field notes were taken during the interviews  
59  
60

1  
2  
3 with healthcare professionals and extended immediately following the  
4 158 meeting. Interviews with mothers were tape-recorded and transcribed  
5  
6 verbatim.  
7

8 160

9 Interview schedule and process

10  
11 162 Two interview schedules, one for health professionals and one for parents,  
12 were developed from the existing literature about BLW [7,8,18] and the  
13  
14 expert opinion of the authors (Table 1 and Table 2). As some healthcare  
15 164 professionals had not heard of BLW, a brief description of BLW was given at  
16  
17 the start of the interview when necessary.  
18 166

19  
20  
21 168 We used a semi-structured interview as outlined in Patton [19] to include, in  
22 the first part, a structured framework to cover the same basic lines of inquiry  
23  
24 around knowledge, attitudes and experiences, for which participants could  
25 170 express their own ideas and understandings. The second part of the interview  
26  
27 followed an unstructured format to allow for probing and further questioning  
28 172 of ideas or individual circumstances that were not included in the original  
29  
30 interview outline.  
31 174  
32  
33  
34

35 Table 1 Questions used in interviews with healthcare professionals

- |    |  |
|----|--|
| 37 | 1. What is your professional role?   |
| 38 | 2. Have you heard of Baby-led Weaning (BLW)?   |
| 39 | 3. Where did you hear about BLW?   |
| 40 | 4. When did you hear about BLW?  |
| 41 |  |
| 42 | 5. If somebody asked you what BLW is, how would you describe it?                             |
| 43 |  |
| 44 | 6. What do you think of BLW as an alternative method for introducing solid foods to infants? |
| 45 |  |
| 46 | 7. Do you consider there may be benefits of BLW?   |
| 47 |  |
| 48 | 8. Do you consider there may be disadvantages of BLW?  |
| 49 |  |
| 50 | 9. Do you have any concerns about BLW?   |

51 176

52  
53 Table 2 Questions used in interviews with mothers who had used Baby-Led Weaning

- |    |  |
|----|--|
| 54 |  |
| 55 | 1. If someone asked you: "What is Baby-Led Weaning (BLW)?" what would you tell them? |
| 56 |  |
| 57 | 2. How did you hear about BLW?   |
| 58 |  |
| 59 |  |
| 60 |  |

3. Why did you decide to try BLW?
  4. How old was your baby when you started BLW?
  5. How old is she now?
  6. How much of her food do you feed her and how much does she feed herself?
  7. Where did/do you get most of your information about BLW?
  8. What were the first foods you offered your baby?
  9. What form were the foods in that you first offered your baby?
  10. Were there any foods you avoided because you were using BLW?
  11. Did your baby eat at the same time as the rest of the family?
  12. Do you think your baby is a fussy or picky eater?
  13. Were you worried about BLW in any way?
  14. Did your baby gag on food?
  15. Was it food she had fed herself?
  16. Did your baby ever choke on food?
  17. Was it food she had fed herself?
  18. Do you consider there were advantages of BLW for you and your baby?
  19. Do you consider there were disadvantages of BLW for you and your baby?
  20. Overall, do you think BLW worked for you and your baby?
  21. Would you recommend other mothers try BLW?
  22. Do you have any useful tips for other mothers trying BLW?
- NB: "She" or "he" was used appropriately for the sex of the child.

178

### Data analysis

180 The main lines of inquiry (knowledge, attitudes and experiences) from the  
181 interviews were used as an initial guide in a directed content analysis [20],  
182 and are referred to here as categories. Content analysis [19] was performed  
183 on all interviews by reviewing all transcripts several times for recurring sub-  
184 categories (reviewing the two groups separately). Sub-categories were  
185 identified from manifest content (the visible, obvious components) [21],  
186 because the aim was to extract and report on the descriptive level of content  
187 and not to provide a deep level of interpretation and underlying meaning.  
188 Participants were recruited until we reached saturation of sub-categories,  
189 and we ensured that sub-categories were, as far as possible, defined so that  
190 they were exhaustive and mutually exclusive. Data analysis was led by one  
191 member of the research team (SC); and interpretation was verified during  
192 research team meetings (with RWT and ALH) to scrutinise sub-categories as

1  
2  
3 they were identified. Each category and its sub-categories have been  
4  
5 194 summarized, and illustrative quotes are included.  
6  
7

## 8 196 RESULTS

9 Thirty-one healthcare professionals were interviewed, comprising: practice  
10  
11 198 nurses (n=11), Well-Child providers (a government funded service  
12 supporting families with young children and assessing health status, see:  
13  
14 200 <http://www.wellchild.org.nz/>) (n=4), dietitians (n=4), general practitioners  
15 (n=5), paediatricians (n=2), lactation consultants (n=2), midwives (n=2), and  
16  
17 202 a paediatric Speech-Language Therapist (n=1). The mothers were twenty  
18 mothers who had a child aged 8 - 24 months (mean=13 months).  
19  
20

21 204

### 22 Healthcare Professionals

23  
24 206 The sub-categories that emerged were remarkably consistent across the  
25 interviews with healthcare professionals.  
26  
27

28 208

#### 29 Knowledge

30  
31 210 Nearly half (n=13/31) of the healthcare professionals had heard about BLW.  
32 Most of these had been introduced to the concept by their colleagues or  
33  
34 212 friends and family (rather than patients). The healthcare professionals who  
35 knew about BLW described it as the child feeding themselves whole foods,  
36  
37 214 instead of being spoon-fed purées. There was little discussion of other aspects  
38 of BLW.  
39  
40

41 216

#### 42 Attitudes

43  
44 218 All healthcare professionals considered that BLW could be beneficial for the  
45 family and the child.  
46  
47

48 220

49 Healthcare professionals considered that shared family mealtimes would be  
50  
51 222 the main advantage of BLW. They were aware of the nutritional and  
52 psychological benefits of family meals and they envisaged family mealtimes  
53  
54 224 would be easier and more pleasant with BLW:  
55  
56  
57  
58  
59  
60

1  
2  
3  
4  
5 226 *The best thing is that an adult can eat their meal while the child is*  
6 *having theirs. There's no juggling trying to feed the baby while shoving a*  
7 *spoonful for yourself. (General Practitioner 3)*

8 228

9  
10 Some healthcare professionals thought mealtime battles would be less likely  
11 230 with BLW for two reasons: mothers would have an alternative approach to  
12 try if their child refused to be spoon-fed; and because BLW allows the child to  
13 eat at their own pace and stop when they have had enough, they would not be  
14 232 "bribed" or "forced" to eat food:

15  
16  
17  
18 234 *I think it's healthier that the baby is in control of what they eat... and you*  
19 *aren't forcing them to eat...there's far too many of us who just finish our*  
20 *plates instead of stopping when we are full. (Dietitian 2)*  
21 236

22  
23  
24  
25 238 Overall, healthcare professionals thought BLW would encourage healthier  
26 dietary behaviours by promoting a wider variety of foods and allowing the  
27 child to explore and learn about food at their own pace:  
28 240

29  
30 *Being able to look at it, hold it and see it as food, instead of slop must*  
31 *have advantages? (Paediatrician 2)*  
32 242

33  
34  
35 244 They also considered BLW would encourage better appetite and self-  
36 regulation skills, as mothers would be less able to control the child's food  
37 intake. They saw similarities between BLW and breastfeeding on demand  
38 246 and thought the two would complement each other well.

39  
40  
41  
42 248

43 A number of healthcare professionals who had children of their own thought  
44 250 BLW would be more convenient than the conventional method of spoon-  
45 feeding purées:  
46

47  
48  
49 252 *It sounds so much easier. Making purées is time consuming, and then*  
50 *they hardly eat anything and you have to throw it all out or you buy*  
51 *those jars of food, which are really expensive. (Dietitian 4)*  
52 254

53  
54  
55 256 Healthcare professionals suggested two developmental advantages: BLW  
56 might encourage better oral and chewing skills because the child is offered  
57  
58  
59  
60

1  
2  
3 258 pieces of food to eat so they may have more opportunity to develop their  
4 mouth and jaw movements instead of sucking food from a spoon as they do  
5  
6 260 with purées; and enhanced fine motor skills as the child has greater  
7 opportunities to manipulate food with their fingers and practice their fine  
8  
9  
10 262 motor movements:

11  
12 *The BLW method could have real advantages for coping with food and*  
13 264 *learning to eat i.e. for oral development. If babies are fed purées for too*  
14 *long they miss important windows for introducing different food*  
15 *textures. (Speech-Language Therapist 1)*  
16 266

17  
18  
19  
20 268 *There must be some sort of fine motor benefits for baby being able to*  
21 *play, essentially, with its food. (General Practitioner 5)*  
22

23  
24 270

25 However, in addition to these potential benefits, strong concerns about BLW  
26  
27 272 were also expressed.

28  
29  
30 274 Choking was a major concern expressed by many of the healthcare  
31 professionals, particularly those who had not observed BLW. The potential  
32  
33 276 risk of choking meant most healthcare professionals felt reluctant to  
34 recommend BLW:  
35

36  
37 278 *The potential for choking would make me feel very hesitant about giving*  
38 *my child whole food at 6 months. As a health professional I'd need to see*  
39 *some sound evidence before I could endorse this method [BLW].*  
40 280  
41  
42 *(Dietitian 2)*  
43

44 282

45 The specific concerns voiced regarding choking were that a 6 month old  
46  
47 284 infant would not be developmentally ready to chew whole pieces of food and  
48 that mothers may leave the infant alone in their highchair with their food.  
49  
50 286 Additionally healthcare professionals considered that mothers may become  
51 competitive about their infant's BLW progress, considering that their child is  
52  
53  
54 288 more advanced if they have certain foods or a greater variety of foods earlier  
55 than other children, and therefore might be motivated to offer unsafe foods  
56  
57 290 that would increase the child's risk of choking:  
58  
59  
60

1  
2  
3 *Just give the baby that food, she'll be fine. Sometimes it's almost like a*  
4 292 *challenge to see how they cope, another one of those competitive*  
5 *parenting things...oh look she's eating raw carrot at age 6 months.*  
6  
7  
8 294 *(Dietitian 1)*  
9

10  
11 296 However, one healthcare professional considered that BLW may work well  
12 for parents whose infant experiences feeding problems when spoon-feeding  
13  
14  
15 298 is used:

16 *I know of similar feeding methods which are often used with children*  
17 300 *whose parents are having feeding difficulties with spoon-feeding and*  
18 *these can work very well. (Speech-Language Therapist 1)*  
19  
20  
21

22 302

23 Healthcare professionals considered that there were two possible dietary  
24  
25 304 disadvantages with BLW: the potential for growth faltering, and for poor iron  
26 status. There was concern that adopting BLW would mean forgoing any iron-  
27  
28 306 fortified infant cereal, and that a BLW diet would comprise low-energy low-  
29 iron fruits and vegetables and include very few iron-rich foods. In addition to  
30  
31  
32 308 low-energy foods, clumsy self-feeding (particularly at the beginning of BLW)  
33 might lead to growth faltering.  
34

35 310 *"The two parents I know who have chosen BLW are offering only fruits*  
36 *and vegetables...Although fruits and vegetables are great foods, babies*  
37 312 *need more nutrients... So I wonder how they would get these [nutrients]*  
38 *if they were only having fruits and vege...nutrients could be limited..."*  
39  
40  
41  
42 314 *(General Practitioner 1)*  
43  
44

45 316 Contrasting this, a few healthcare professionals thought BLW infants could  
46 consume energy beyond their needs as a result of poor food choices:

47  
48 318 *Young children arrive here and they're under two eating twisties [an*  
49 *extruded cereal snack], chocolate biscuits - would BLW be that for some*  
50  
51  
52 320 *mothers? (Practice Nurse 2)*  
53  
54

55 322 At the other extreme, some healthcare professionals commented that mothers  
56 (especially first-time mothers) are often apprehensive about their infant's  
57  
58  
59  
60

1  
2  
3 324 growth and compare it to that of other infants and that a “chubby” or “bonny”  
4 baby is viewed as healthy even when it reflects overweight or obesity. Some  
5  
6 326 healthcare professionals suggested BLW may increase parental anxiety. They  
7  
8 thought mothers would struggle watching their infant learn to eat, especially  
9  
10 328 at the start when they might eat very little:

11 *Parents expect to see their child growing consistently - linear growth -*  
12 *and if they do not this evokes anxiety. How would you know if the child*  
13 *was eating enough? Parents would not cope with the child playing with*  
14 *food and not eating it. (Practice Nurse 7)*  
15  
16 332

17  
18  
19  
20 334 Finally, some healthcare professionals thought BLW would be messy and for  
21 the mothers and suggested that there would be a lot of food wasted, which  
22  
23 336 many mothers would not tolerate:

24 *I could imagine in the first couple of weeks that the infant wouldn't eat*  
25 *much and that there would be an awful lot of playing and squashing.*  
26 338 *Some mothers may not be able to cope with this. (Practice Nurse 11)*  
27  
28  
29

30 340  
31  
32 *I would be concerned about the mess and wastage of food. Some of our*  
33 342 *families live on a very tight food budget and I've seen the mess when*  
34 *doing BLW and I think a lot of food gets wasted.” (Well Child Provider 1)*  
35  
36  
37 344

## 38 39 40 346 Mothers

41  
42 The sub-categories that emerged were very consistent across the interviews  
43  
44 348 with mothers.

45  
46  
47 350 Most mothers (n=18/20) started BLW when their child was 5.5 - 6 months of  
48 age and all mothers had exclusively breastfed their child up until this age. The  
49  
50 352 BLW approach advises mothers to watch for signs of developmental  
51  
52 readiness before introducing their child to solid food. However most mothers  
53  
54 354 recalled starting solids at an age based on advice from their healthcare  
55 professional or because they were following the WHO guidelines, although a  
56  
57  
58  
59  
60



1  
2  
3 356 small number (n=2/20) of mothers started solids when their infant started  
4 reaching out for food.

5  
6 358

7  
8 The most commonly offered first foods were vegetables (steamed or boiled  
9 pumpkin, potato, kumara (New Zealand sweet potato), broccoli, carrot)  
10 360 (n=13/20) and fruit (avocado, banana) (n=11/20). Most mothers (n=16/20)  
11 reported that their child shared every meal with one or more family  
12 members. Mothers liked that their child could feed themselves with BLW,  
13 362 however many (n=15/20) also reported some spoon-feeding, although this  
14 was infrequent or only in unusual circumstances, such as when their child  
15 was sick. Mothers reported doing this to avoid mess, to increase iron intake  
16 366 by spoon-feeding iron-fortified infant cereal, or to increase energy intake  
17 especially when their infant was sick or appeared too tired to self-feed.  
18  
19  
20  
21  
22  
23 368

24  
25  
26  
27 370 Knowledge

28 The majority of mothers defined BLW as having 3 main components: offering  
29  
30 372 finger-sized pieces of food, allowing the child to be in control of how much  
31 they ate, and not spoon-feeding purées:

32  
33 374 *Letting your baby lead in terms of the pace and amount of solids*  
34 *eaten...offering them whole, safe foods when they are physically ready to*  
35 *feed themselves... keeping milk [breast/formula] as their main food*  
36 376 *source until they naturally increase the amount they eat and drop milk*  
37 *feeds on their own. (Mother 2)*  
38  
39  
40 378  
41  
42

43 380 Nearly half of the mothers first heard about BLW through a parenting group  
44 while others had discovered it online or were told about it by their Well-Child  
45 provider. One mother had not heard of the term "Baby-Led Weaning" but said  
46 382 "it was instinctive" to offer her child pieces of food and allow them to feed  
47 themselves. The majority of mothers obtained their BLW information from  
48 384 online sources, drawing on other mothers' experiences through blogs, threads  
49 and forums.  
50  
51  
52  
53 386  
54

55  
56  
57 388 Attitudes  
58  
59  
60

1  
2  
3 The main reason mothers chose to follow BLW was because it “*made sense*”  
4 and “*seemed logical*”. Lifestyle reasons also motivated mothers to follow  
5 390 BLW. They considered that BLW was less time consuming and less expensive  
6  
7  
8 392 than making puréed food:

9  
10 *With three other children, I was way too busy to prepare special foods i.e.*  
11 394 *purées and also I didn't want to buy them - they're expensive. (Mother*  
12 *15)*

13  
14  
15 396  
16  
17 Mothers considered that there were advantages of BLW during the  
18 398 complementary feeding period, and also in the future. During the  
19  
20 complementary feeding period, mothers reported less meal preparation (the  
21  
22 400 baby ate what the family was eating, there was no purée preparation) and  
23  
24 reduced mealtime stress because they were not spoon-feeding the baby and  
25  
26 402 eating their own meal simultaneously. Some mothers (n=6/20) reported it  
27  
28 was liberating that BLW does not include a detailed step-by-step weaning  
29  
30 404 protocol and instead promotes responding to the infant and thought that  
31  
32 fewer “rules” made the transition to food less frightening and complicated:

33  
34 406 *With my first child I became so worried about getting the food*  
35  
36 *[purées] to exactly the right consistency. It [BLW] made sense to me,*  
37  
38 408 *because she was demand fed so it seemed like the natural*  
39  
40 *progression. (Mother 8)*

41  
42 410  
43  
44 In addition mothers believed that BLW had encouraged their child to develop  
45  
46 412 healthier eating behaviours, for example being able to respond appropriately  
47  
48 to hunger and satiety cues, sharing family meals and eating a wider variety of  
49  
50 414 foods:

51  
52 *I felt it would give my daughter the opportunity to experience, from the*  
53  
54 416 *outset, everything that is pleasurable about food, the textures, colours,*  
55  
56 *individual tastes...a lovely way to have them be a real participant in the*  
57  
58 418 *meal - eating what we eat, copying us, and really joining in...not being*  
59  
60 *fed separately. (Mother 2)*

420

1  
2  
3 Most mothers had no concerns with BLW (n=15/20). Those mothers who did  
4  
5 422 have concerns were worried about the appropriateness of certain foods, for  
6  
7 example raw apple. Current guidelines on types of BLW foods to offer are  
8  
9 424 incomplete and some mothers reported not knowing what foods to offer at  
10 what age:

11 426 *I wasn't worried but a bit concerned that some of the advice was*  
12 *conflicting e.g. the book says apple is fine and people I've spoken to who*  
13 *have used BLW have said no apples. (Mother 7)*  
14  
15 428

16  
17  
18 430 One mother was concerned about her infant's iron intake, so she spoon-fed  
19 her infant iron fortified rice cereal daily while following BLW. Other mothers  
20  
21 432 felt that the iron from breast milk would be adequate until the infant started  
22 eating high iron meat or meat alternatives:  
23  
24

25 434 *Solids are just a taste and texture thing, breast milk or formula being*  
26 *their main nutrition until 9 months, so don't worry if your baby takes*  
27 *their time adjusting to solids. (Mother 6)*  
28  
29 436

30  
31  
32 438 Nearly all mothers (n=19/20) reported that their infant gagged on food. Some  
33 mothers had completed a first aid course prior to their infant starting BLW to  
34  
35 440 equip themselves for dealing with gagging or choking. Gagging was not a  
36 concern to mothers, instead they considered it was a natural part of a child  
37  
38 442 learning to eat and adapting to new textures that are quite different to milk.  
39 Mothers were aware that an infant's gag reflex is much further forward on  
40  
41 444 their tongue when they first start eating and because of this, they understood  
42 gagging was highly likely:  
43  
44

45 446 *I felt like I was really prepared, I had read the book [4] so knew about*  
46 *gagging and choking and that mostly it is gagging because the baby's*  
47 *gag reflex is much further forward than an adult's...gagging is a very*  
48  
49 448 *important learning process. (Mother 12)*  
50  
51

52 450 Mothers viewed gagging as an innate safety mechanism that is activated when  
53 food has not been sufficiently chewed for swallowing. One parent explained  
54  
55 452 that gagging returned the food to the front of the mouth for further chewing  
56 and that if the infant did not gag then the food could cause obstruction and  
57  
58  
59  
60

1  
2  
3 454 possibly choking.  
4  
5

6 456 Mothers were aware choking was a common criticism of BLW, and although  
7 most reported that choking did not occur, 30% (n=6/20) reported one or  
8  
9  
10 458 more episodes. Although choking can be very serious, all mothers who  
11 reported choking (n=6/20) reported that the infant independently dealt with  
12  
13 460 the choking by expelling the food from their mouth through coughing and  
14 mothers did not have to intervene with first aid. All mothers who could recall  
15  
16 462 the food that was responsible (n=4/6) reported that raw apple was the food  
17 their infant had choked on. Mothers expressed feeling more relaxed around  
18  
19  
20 464 four weeks after introducing complementary foods; they saw that their infant  
21 could manage different textures, and was developing more coordinated eating  
22  
23 466 skills. Mothers also felt that by this time the difference between gagging and  
24 choking was more obvious and that they realised it was mostly gagging.  
25  
26

27 468

28 Many of the mothers reported that mealtime mess was the main disadvantage  
29  
30 470 of BLW. Infants were able to pick up their food and “squash, smear and throw  
31 it”. Some mothers were apprehensive about their infant eating in public or at  
32  
33 472 other people’s homes because of the mess. Mess was more of a problem in the  
34 early phases of BLW when the infant had not mastered the coordination skills  
35  
36  
37 474 needed to get food to their mouth, and mothers said as the level of skill  
38 improved the mess declined. Mothers who also had experience with the  
39  
40 476 conventional method of starting solids thought finger foods and self-feeding  
41 were messy whatever the age:  
42

43  
44 478 *As someone who’s done it both ways [BLW and spoon-feeding], I think*  
45 *they’re both pretty messy and wasteful! (Mother 5)*  
46

47 480

48  
49 Some mothers recalled feeling impatient during the first month of BLW as  
50  
51 482 their infant, while learning to eat, could spend long periods of time at the  
52 table and appear to be “*playing with food*”. Additionally mothers reported  
53  
54 484 that some family meals were not appropriate for their baby and that at these  
55 times knowing what to offer the infant was a challenge:  
56  
57  
58  
59  
60

1  
2  
3 486 *I struggled with the “baby eats what the family eats” concept... Most of*  
4 *what we really eat has a lot of salt, sugar, sauces, etc in it, and it takes*  
5  
6 488 *work to think of how to adjust it or intervene in the cooking process to fit*  
7 *baby. (Mother 5)*  
8  
9

490

10  
11 Mothers recalled encountering both positive and negative experiences during  
12 the BLW period, however all the mothers concluded that they would  
13 492 recommend BLW to other mothers:  
14  
15

16 494 *I couldn't imagine any other way of introducing solids and will certainly*  
17 *do BLW with any future children. I think the fact that our son has*  
18 496 *control over eating means that he doesn't have to fight for control...food*  
19 *is not a battleground here. (Mother 19)*  
20  
21  
22

498

23  
24  
25 Two mothers added that they would recommend supplementing BLW with  
26 some spoon-feeding for reassurance about nutrients:  
27 500

28 502 *I say to people to use a combination. I felt good about this because she*  
29 *was able to explore food and learn about it but at the same time get the*  
30 *nutrients that she needed. (Mother 15)*  
31  
32

504

33  
34  
35 Experiences

36  
37 506 Table 3 presents practical recommendations mothers offered for overcoming  
38 challenges when using BLW.  
39

508

40  
41  
42  
43  
44 Table 3 Practical recommendations from mothers for successful Baby-Led Weaning

Practical recommendation	Supporting quote
Place a large cloth under the infant's highchair to collect spilled food - the cloth could be shaken outside and washed in the machine.	<i>“Prepare for mess with bibs, strip the child, messy mats, have a washcloth handy, a hungry dog to eat scraps helps too and then relax and let them go for it.”</i>
Use full cover (sweatshirt) bibs.	
In the warmer (summer) months the family could try eating outside.	

<p>Put the infant in their highchair with their nappy on. Then follow with a bath to wash off any food mess.</p>	
<p>Put infant in the highchair in the kitchen so they can begin their meal while the family meal is being prepared and interact with them while they are eating.</p>	<p><i>"Watch your baby but don't interfere, I wouldn't like someone picking food off my plate and putting it into my mouth because they thought I was eating too slowly. Not to worry too much about quantities – remembering that milk is still on offer."</i></p>
<p>Seek advice from parenting groups and others doing BLW. Collect and share food and recipe ideas.</p>	<p><i>Sometimes you get stuck for ideas of what to offer and talking to others doing BLW can get the creativity going again... It's amazing how many ways there are to cook and present food.</i></p>
<p>Mothers, whether following BLW or not, should complete a first aid course. This should teach the difference between gagging and choking, and can improve confidence for dealing with choking (if it occurs).</p>	<p><i>"Go to a first aid course, preferably one targeted at parents. This will give you confidence to deal with choking if it happens."</i></p>
<p>Have realistic expectations about mess and your infant's eating progress. Mothers need to appreciate that starting solids is a transition period which may last many months.</p>	<p><i>"Don't think that things will be heaps easier in the short-term than the conventional way. A baby with finger food will still need a lot of support, because they'll drop things a lot and need you to pick them up."</i></p>
<p>Try and enjoy the BLW experience by allowing the baby to explore food and have fun with eating.</p>	<p><i>"Don't stress about the quantities they eat, the mess they make or the seemingly frequent gagging episodes."</i></p>

510

## 512 DISCUSSION

514 Although anecdotal reports suggest that the use of BLW is increasing, fewer  
516 than half of the healthcare professionals in the current study had heard about  
518 this approach. Those who were aware of BLW had limited knowledge of the  
520 details and were not aware of all the practices promoted as part of BLW. [4,5]  
522 Healthcare professionals suggested potential benefits of BLW (greater  
524 opportunity for shared family meal times, fewer mealtime battles, healthier  
526 eating behaviours, greater convenience, and possible developmental  
528 advantages) but most felt reluctant to recommend it because of their concern

1  
2  
3 about the potential increased risk of choking. Most healthcare professionals  
4  
5 522 had not seen BLW in action and therefore had difficulty understanding how a  
6  
7 6-month-old infant could possess the mastication and coordination skills  
8  
9 524 needed to safely manage whole pieces of food.

10  
11 526 Overall, mothers reported that using BLW had been a positive experience,  
12 that they recommended it to other mothers, and would follow it again if they  
13  
14 528 had another child. Interestingly, many of the mothers in this study did not  
15 follow BLW strictly as outlined by Rapley [4]. Although they generally  
16  
17 530 embraced BLW techniques, many also reported using a small amount of  
18 spoon-feeding. This suggests that, in practice, many parents following a BLW  
19  
20 532 approach are probably somewhere along the continuum of some spoon-  
21 feeding to total self-feeding, albeit much more at the latter end. As well as it  
22  
23 534 being described as the “*logical way*” to introduce complementary foods,  
24 mothers reported that BLW was less time consuming, involved less meal  
25  
26 536 preparation, caused less stress, and resulted in fewer mealtime battles.  
27 Although some mothers struggled with drawn out mealtimes and the food  
28  
29 538 mess created by the self-feeding infant, these disadvantages did not  
30 discourage these mothers from following BLW. Furthermore, mothers who  
31  
32 540 had previously used the conventional method (spoon-feeding purées) with  
33 one of their older children considered both approaches (BLW and  
34  
35 542 conventional) to be messy.

36  
37  
38  
39  
40  
41  
42 544 Healthcare professionals and mothers’ attitudes toward BLW were similar, in  
43 some respects. Both agreed that BLW may promote shared family meals,  
44  
45 546 reduce mealtime battles, and be more convenient than spoon-feeding purées,  
46 they also agreed that the mess produced when an infant self-feeds could be  
47  
48 548 substantial. Furthermore, both groups considered BLW could encourage  
49 healthier eating patterns, including better self-regulation of energy intake.  
50  
51 550 However, there were some noticeable differences in the attitudes of the two  
52 groups, particularly concerning safety and nutrient sufficiency. Healthcare  
53  
54 552 professionals had serious concerns about potential choking and low iron  
55 intake, as well as the ability of an infant to self-feed at 6 months. Although  
56  
57  
58  
59  
60

1  
2  
3 554 some mothers had considered the potential problems raised by healthcare  
4 professionals they were not as concerned by these. Moreover, they reported  
5  
6 556 that these concerns decreased as they followed BLW and their baby appeared  
7 happy and healthy.  
8

9  
10 558

11 The healthcare professionals' concern about a possible increased risk of  
12 choking aligns with opinions expressed by other healthcare professionals.[5]  
13 [22,23] Choking is more likely with very hard foods such as raw apple or  
14  
15 562 round coin-shaped foods such as sausage. [24] Children develop the ability to  
16 chew before they develop the ability to hold food in their mouth or to move it  
17  
18 564 backwards for swallowing. [25] At about 6 months of age, infants develop a  
19 munching type oral-motor action; this movement, in conjunction with the  
20  
21 566 ability to sit unsupported, promotes swallowing of thicker, chunkier pieces of  
22 food. [26] The founder of BLW, Gill Rapley, disputes that a healthy 6-month-  
23  
24 568 old infant would be at increased risk of choking with BLW. [4,5] Rapley  
25 acknowledges gagging is common with BLW because at 6 months of age the  
26  
27 570 baby's gag reflex is further forward on their tongue than it is at 1 year. [5]  
28 However, based on her personal observations, Rapley considers choking is  
29  
30 572 more likely with spoon-feeding because the baby learns to use suction to take  
31 the purée from the spoon, which causes food to be taken to the back of the  
32  
33 574 throat where it is swallowed, encouraging the infant to learn to swallow food  
34 without chewing first. [5]  
35  
36

37  
38  
39  
40 576

41 Interestingly most mothers in the current study were not concerned about  
42  
43 578 choking. Although some had initial concerns, these quickly diminished when  
44 they witnessed how proficient their infant was at bringing food forward and  
45  
46 580 expelling it out of their mouth if needed, and all mothers felt prepared for  
47 dealing with a choking incident if it happened. Others have reported similar  
48  
49 582 findings with mothers following BLW initially being concerned about choking  
50 but over time becoming less nervous and more able to distinguish between  
51  
52 584 the action of gagging to move food and actual choking. [27] Furthermore  
53 93.5% of the BLW group in the recent study by Townsend and Pitchford[9]  
54  
55 586 reported never having experienced a choking incident. It is of concern,  
56  
57  
58  
59  
60



1  
2  
3 however, that in the current study, 30% of mothers reported at least one  
4  
5 588 choking incident, most with raw apple. No serious incidents were reported  
6  
7 and this raises the question of whether mothers correctly identified choking  
8  
9 590 or whether they had instead witnessed the less serious action of gagging.  
10  
11 However, given that raw apple was the cause of most reported choking  
12  
13 592 incidents, and fulfills the criteria of a high-risk food, being hard and in small  
14  
15 594 pieces when bitten, it would be sensible to discourage parents who are  
16  
17 following BLW from offering raw apple to their infant.

18  
19 596 Healthcare professionals expressed concern about whether BLW infants  
20  
21 would be able to consume sufficient iron. In New Zealand, spoon-feeding iron-  
22  
23 598 fortified baby rice cereal is a popular way for mothers to increase their  
24  
25 infant's iron intake. Healthcare professionals in this study quickly recognized  
26  
27 600 that this would not be possible with BLW and they speculated that this would  
28  
29 put the infant at risk of suboptimal iron status, which is already a concern for  
30  
31 602 many New Zealand infants (6.9% having iron deficiency anaemia, and a  
32  
33 further 12.5% having suboptimal iron status[28]). Most mothers in the  
34  
35 604 present study believed that the breast milk their infant was receiving would  
36  
37 supply enough iron until meat or other high-iron meat alternatives were  
38  
39 606 introduced. Similarly, mothers from Brown and Lee[27] were not concerned  
40  
41 about iron intake. Although healthy, term, normal birth weight infants are  
42  
43 608 considered to obtain enough iron from their mother's breast milk and from  
44  
45 the redistribution of iron from haemoglobin to iron stores during the first six  
46  
47 610 months of life, [29] from six months of age, iron becomes a critical nutrient  
48  
49 and all infants should receive iron-rich complementary foods such as meat,  
50  
51 612 meat alternatives or iron-fortified foods. [2,29] [30-32]

52  
53 614 Many of the healthcare professionals were not convinced that a 6-month old  
54  
55 infant could eat enough to keep pace with growth when self-feeding,  
56  
57 616 particularly in the early days of complementary feeding. Only one study  
58  
59 appears to have examined this, and suggested that there may be an increased  
60  
618 incidence of underweight in BLW children (3/63) compared to spoon-fed  
children (0/63), although most children were of normal weight, and as

1  
2  
3 620 acknowledged by the authors, the numbers were small, and the cases and  
4 controls drawn from different populations. It has been suggested that purées  
5  
6 622 (which are frequently made of fruit or vegetables and thinned down with  
7 water or milk) are often very low in energy, meaning that the small volume of  
8  
9  
10 624 purées typically consumed in the early weeks would contribute relatively  
11 little to meeting a conventionally fed infant's nutrient requirements. [7] In  
12  
13 626 contrast, finger foods, if carefully chosen, can be very nutrient dense, so an  
14 infant who appears to be eating little when self-feeding may potentially be  
15  
16  
17 628 closer to meeting their nutrient requirements. [7] Only one parent in the  
18 current study reported being concerned about her child being able to eat  
19  
20 630 enough, although many mothers reported spoon-feeding their infant at times  
21 when they were potentially at greater risk of under eating, i.e. when they  
22  
23 632 were unwell or very tired. Because of the nature of this self-selected sample it  
24 is possible that mothers with concerns about this issue may have  
25  
26  
27 634 discontinued or chosen not to follow BLW. At this point, no research has  
28 examined the actual food and nutrient intake of children following a BLW  
29  
30 636 approach compared with a more traditional method of infant feeding.  
31  
32

33  
34 638 The healthcare professionals and mothers who took part in the current study  
35 were self-selected. Furthermore, the sample size was small. Although this  
36  
37 640 study is not intended to present representative results given its qualitative  
38 nature, participants were recruited in a number of different ways, and the  
39  
40 642 interviews were continued until well after saturation for both healthcare  
41 professionals and mothers, suggesting that the majority of views of BLW in  
42  
43 644 these groups are likely to have been captured. The first author conducted the  
45 content analysis of the transcripts, and although the co-authors discussed the  
46  
47 646 interpretation of individual participant quotes, they did not conduct a  
48 separate full analysis of the transcripts. However, we consider that this was  
49  
50 648 sufficient to ensure that the findings are trustworthy, both because our aim  
51 was to capture manifest (i.e. description of the visible, obvious components),  
52  
53  
54 650 rather than latent (i.e. interpretation of underlying meaning) content [33], and  
55 because we have provided direct participant quotes for each sub-category so  
56  
57 652 that the reader can judge for themselves the appropriateness of the coding.  
58  
59  
60

1  
2  
3  
4  
5 654 Although there was some agreement between healthcare professionals and  
6 mothers that BLW was likely to lead to more shared family meals, fewer  
7  
8 656 mealtime battles, potentially healthier eating patterns, and to be more  
9 convenient, although messy, the healthcare professionals were, overall,  
10  
11 658 reluctant to recommend the method. They were concerned that BLW could  
12 potentially increase choking and adversely affect the infant's iron status and  
13 energy intake. In this context, it is interesting that the UK Department of  
14 Health has supported the inclusion of some hand-held first foods in their most  
15 recent recommendations for infant feeding. [34,35] Undoubtedly, further  
16 research of BLW is warranted especially concerning its potential to positively  
17 influence eating behaviours, as well as its safety and nutrient sufficiency.  
18  
19  
20  
21  
22  
23

24  
25 666 Acknowledgements We would like to thank all the families and healthcare  
26 professionals who contributed to this study.  
27

28 668 Contributors SC, ALH and RWT were all involved with the conception and  
29 design of the study, the analysis and interpretation of the data and the writing  
30 and editing of this paper. SC conducted the interviews with participants and  
31 was responsible for the analysis and interpretation of the data. SC wrote the  
32 first draft of the paper, and A-L H and RWT made important intellectual  
33 contributions to the content and approved the final version.  
34  
35 672

36  
37  
38 674 Funding This research was conducted using the authors' (RWT) resources  
39 and received no specific grant from any funding agency in the public,  
40 commercial or non-profit sectors.  
41  
42 676

43 Competing interests None.

44  
45 678 Ethical approval Ethical approval was obtained from the University of Otago  
46 Ethics Committee.  
47

48  
49 680 Provenance and peer review Not commissioned.

50 Data sharing statement No additional data are available.  
51

52 682  
53  
54  
55  
56  
57  
58  
59  
60

## REFERENCES

- 684
- 686 1. World Health Organization. Infant and young child feeding: model chapter  
for textbooks for medical students and allied health professionals.  
688 Geneva, Switzerland: World Health Organization, 2009.
- 690 2. Ministry of Health. *Food and Nutrition Guidelines for Healthy Infants and  
Toddlers (Aged 0-2): A background paper (4th Ed)*. Wellington: Ministry  
of Health, 2008.
- 692 3. Department of Health (DoH). *Infant Feeding*. London, UK: Department of  
Health, 2003.
- 694 4. Rapley G, Murkett T. *Baby-Led Weaning: Helping your child love good food*.  
London: Vermilion, 2008.
- 696 5. Rapley G. Baby-led weaning: transitioning to solid foods at the baby's own  
pace. *Community Pract* 2011;84(6):20-23.
- 698 6. Sachs M. Baby-led weaning and current UK recommendations - are they  
compatible? *Matern Child Nutr* 2011;7:1-2.
- 700 7. Wright CM, Cameron K, Tsiaka M, Parkinson KN. Is baby-led weaning  
feasible? When do babies first reach out for and eat finger foods?  
702 *Matern Child Nutr* 2011;7(1):27-33.
- 704 8. Brown A, Lee M. Maternal control of child feeding during the weaning  
period: differences between mothers following a baby-led or standard  
weaning approach. *Matern Child Health J* 2011;15(8):1265-71.
- 706 9. Townsend E, Pitchford N. Baby knows best? The impact of weaning style on  
food preferences and body mass index in early childhood in a case-  
708 controlled sample. *BMJ Open* 2012;2:1.
- 710 10. Abel S, Park J, Tipene-Leach D, Finau S, Lennan M. Infant care practices in  
New Zealand: a cross-cultural qualitative study. *Soc Sci & Med*  
2001;53(9):1135-48.
- 712 11. Campbell ND, Soeken KL, Rankin EAD. Infant Weaning Patterns and  
Related Maternal-Infant Health Outcomes. *Public Health Nurs*  
714 1986;3(1):57-63.
- 716 12. Arden MA. Conflicting influences on UK mothers' decisions to introduce  
solid foods to their infants. *Matern & Child Nutr* 2010;6(2):159-73.
- 718 13. Wright C, Parkinson K, Drewett R. Why are babies weaned early? Data  
from a prospective population based cohort study. *Arch Dis Child*  
2004;89(9):813-16.
- 720 14. Hellings P, Howe C. Assessment of Breastfeeding Knowledge of Nurse  
Practitioners and Nurse-Midwives. *J Midwifery Womens Health*  
722 2000;45(3):264-70.
- 724 15. Freed GL, Clark SJ, Lohr JA, et al. Pediatrician involvement in breast-  
feeding promotion: a national study of residents and practitioners.  
*Pediatrics* 1995;96(3 Pt 1):490-4.
- 726 16. Freed GL, Clark SJ, Sorenson J, et al. National assessment of physicians'  
breast-feeding knowledge, attitudes, training, and experience. *JAMA*  
728 1995;273(6):472-6.
- 730 17. Schanler RJ, O'Connor KG, Lawrence RA. Pediatricians' practices and  
attitudes regarding breastfeeding promotion. *Pediatrics*  
1999;103(3):E35.

- 1  
2  
3 732 18. Brown A, Lee M. A descriptive study investigating the use and nature of  
4 baby-led weaning in a UK sample of mothers. *Matern Child Health J*  
5 734 2011;7(1):34-47.  
6  
7 19. Patton MQ. *Qualitative Research and Evaluation Methods*. 3rd ed.  
8 736 Thousand Oaks, California Sage Publications, Inc., 2002.  
9 20. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis.  
10 738 *Qualitative health research* 2005;15(9):1277-88.  
11 21. Kondracki NL, Wellman NS, Amundson DR. Content analysis: review of  
12 740 methods and their applications in nutrition education. *Journal of*  
13 *nutrition education and behavior* 2002;34(4):224-30.  
14 22. Dietitians NZ Paediatric SIG convenor. Dietitians NZ Paediatric Special  
15 Interest Group Newsletter. In: NZDA, editor. May ed, 2010.  
16 744 23. Rowell K and Becker H. baby-led-weaning-or-starting-solids-book-review-  
17 and-nutritionist-weighs-in-with-her-7-month-old-daughter.  
18 <http://thefeedingdoctor.com>, 2011.  
19 746  
20 24. Byard RW, Gallard V, Johnson A, et al. Safe feeding practices for infants  
21 748 and young children. *J Paediatr Child Health* 1996;32(4):327-9.  
22 25. Naylor A, Morrow A. *Developmental readiness of normal full term infants to*  
23 750 *progress from exclusive breastfeeding to the introduction of*  
24 *complementary foods: reviews of the relevant literature concerning*  
25 752 *infant immunologic, gastrointestinal, oral motor and maternal*  
26 *reproductive and lactational development*. Washington DC: Wellstart  
27 International, LINKAGES Project Academy for Educational  
28 754 Development, 2001.  
29 756 26. Pridham KF. Feeding behavior of 6-to 12-month-old infants: Assessment  
30 and sources of parental information. *J Pediatr* 1990;117(2(Pt 2)):S174-  
31 758 80.  
32 27. Brown A, Lee M. An exploration of experiences of mothers following a  
33 baby-led weaning style: developmental readiness for complementary  
34 760 foods. *Matern Child Health J* 2011.  
35 762 28. Soh P, Ferguson EL, McKenzie JE, et al. Iron deficiency and risk factors for  
36 lower iron stores in 6-24-month-old New Zealanders. *Eur J Clin Nutr*  
37 764 2004;58(1):71-79.  
38 29. Domellof M. Iron requirements in infancy. *Ann Nutr Metab* 2011;59(1):59-  
39 766 63.  
40 30. Leong W-I, Lönnerdal B. Iron Nutrition. In: Anderson G, McLaren G,  
41 768 editors. *Iron Physiology and Pathophysiology in Humans*: Humana  
42 Press, 2012:81-99.  
43 770 31. Kramer MK, R. Optimal duration of exclusive breastfeeding. *Cochrane*  
44 *database of systematic reviews* 2002(1):CD003517.  
45 772 32. World Health Organization. Guiding Principles For Complementary  
46 Feeding of the Breastfed Child. Geneva, Switzerland, 2004.  
47 774 33. Graneheim UH, Lundman B. Qualitative content analysis in nursing  
48 research: concepts, procedures and measures to achieve  
49 trustworthiness. *Nurse Educ Today* 2004;24(2):105-12.  
50 776 34. Department of Health. Start4Life: No Rush to Mush.  
51 <http://www.nhs.uk/start4life/pages/no-rush-to-mush.aspx>, 2009.  
52 778  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 35. National Health Service (NHS). Your baby's first solid foods.

4 780 <http://www.nhs.uk/Conditions/pregnancy-and-baby/Pages/solid->  
5 [foods-weaning.aspx](http://www.nhs.uk/Conditions/pregnancy-and-baby/Pages/solid-): NHS, 2011.

6 782  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3  
4  
5  
6  
7  
8 Healthcare professionals' and mothers' knowledge of, attitudes to, and  
9 experiences with, Baby-Led Weaning: a content analysis study  
10 5

11  
12  
13  
14  
15  
16  
17  
18 10 Sonya L Cameron<sup>1</sup>

19 Anne-Louise M Heath<sup>1</sup>

20 Rachael W Taylor<sup>2</sup>

21  
22  
23  
24  
25 From the

26 15 Departments of Human Nutrition<sup>1</sup> and Medicine<sup>2</sup>

27 University of Otago

28 Dunedin, New Zealand  
29  
30  
31  
32  
33  
34

35 20 Address correspondence to:

36 Name: Anne-Louise M Heath

37 Mailing address: Department of Human Nutrition, University of Otago, PO Box  
38 56, Dunedin, New Zealand 9054

39 Telephone: 64 3 479 8379

40 25 Fax: 64 3 479 7958

41 Email: anne-louise.heath@otago.ac.nz  
42  
43  
44  
45  
46  
47  
48  
49  
50

51 **Key words** Healthcare professionals, mothers, complementary feeding, baby-  
52 led weaning.  
53 30

54 **Word count** = 4609  
55  
56  
57  
58  
59  
60

## ABSTRACT

**Objective:** Baby-Led Weaning (BLW) is an alternative approach for introducing complementary foods to infants that emphasizes infant self-feeding rather than adult spoon-feeding. Here we examined healthcare professionals' and mothers' knowledge of, attitudes to, and experiences with, BLW.

**Design, setting and participants:** Healthcare professionals (n=31) and mothers who had used BLW (n=20) completed a semi-structured interview using one of two tailored interview schedules examining their knowledge of, attitudes to, and experiences with, BLW. Interview notes and transcripts were analysed using content analysis to identify sub-categories and extract illustrative quotes.

**Results:** Healthcare professionals had limited direct experience with BLW and the main concerns raised were the potential for increased risk of choking, iron deficiency, and inadequate energy intake. Although they suggested a number of potential benefits of BLW (greater opportunity for shared family meal times, fewer mealtime battles, healthier eating behaviours, greater convenience, and possible developmental advantages) most felt reluctant to recommend BLW because of their concern about the potential increased risk of choking. By contrast, mothers who had used this style of feeding reported no major concerns with BLW. They considered BLW to be a healthier, more convenient and less stressful way to introduce complementary foods to their infant and recommended this feeding approach to other mothers. Although mothers did not report being concerned about choking, 30% reported at least one choking episode – most commonly with raw apple.

**Conclusion:** Given the lack of research on BLW, further work is needed to determine whether the concerns expressed by healthcare professionals and potential benefits outlined by mothers are valid. The current study suggests there is mismatch between healthcare professionals and parents knowledge of, attitudes to and experiences with BLW.



## ARTICLE SUMMARY

65

### Article focus

- Healthcare professionals are an important source of information for mothers during the complementary feeding period.
- The literature suggests that there is a mismatch between healthcare professionals' and mothers' knowledge and attitudes to infant feeding.
- Baby-Led Weaning (BLW) is an alternative approach for introducing complementary foods to infants that is becoming increasingly popular with mothers.

75 Key messages

- Healthcare professionals identified a number of potential benefits of BLW including more shared family meals, promotion of healthier eating behaviours and greater convenience for mothers. However, healthcare professionals also had strong concerns about the risk of iron deficiency, inadequate energy intake and choking, and as a result most felt reluctant to recommend it.
- Mothers who had practised BLW reported more benefits and had fewer concerns about BLW than healthcare professionals.
- Some parents reported offering raw apple to their infant when they were following BLW. This practice should be discouraged because raw apple is a choking hazard at this age.

### Strengths and limitations of this study

- This is the first study to interview healthcare professionals about BLW.
- The healthcare professionals and mothers were self-selected.

## INTRODUCTION

1  
2  
3  
4  
5 92 Traditionally the method of infant feeding recommended to mothers in most  
6 developed countries, including the United Kingdom and New Zealand, has  
7  
8 94 been to spoon-feed the infant puréed food before moving on to mashed and  
9  
10 finger foods as the child grows. [1-3] Recently an alternative approach,  
11  
12 96 known as Baby-Led Weaning (BLW), has emerged [4,5] and anecdotal  
13  
14 evidence suggests that many mothers are attempting BLW. [6] Baby-Led  
15  
16 98 Weaning recommends that instead of spoon-feeding, mothers encourage their  
17  
18 infant to self-feed, from about six months of age. Although infants following  
19  
20 the more traditional method of infant feeding may be offered finger foods, in  
21  
22 100 many countries, including New Zealand, it is recommended that this does not  
23  
24 occur until 8-9 months of age, long after the introduction of puréed food. By  
25  
26 102 contrast, BLW, in its purest form, does not include any spoon-feeding by the  
27  
28 104 adult. The infant is only offered pieces of whole food, appropriately prepared,  
29  
30 so that the infant can feed themselves right from the start of the  
31  
32 106 complementary feeding period.

33  
34 108 The small body of existing research suggests that BLW is feasible for most 6-  
35  
36 month old infants from a motor development point of view. [7] It also  
37  
38 110 suggests that BLW is associated with lower levels of maternal anxiety,  
39  
40 restriction, pressure to eat and monitoring during the complementary feeding  
41  
42 112 period; [8] and perhaps healthier eating patterns and BMI. [9] However, in  
43  
44 the absence of any longitudinal or randomized controlled trial data, it is not  
45  
46 114 possible to determine whether these associations are causal.

47  
48 116 Healthcare professionals are an important source of information for mothers  
49  
50 during the complementary feeding period, and can potentially have as much  
51  
52 118 influence on decisions around milk feeding and introducing solids as cultural  
53  
54 values or material resources. [10,11] However, healthcare professionals'  
55  
56 120 knowledge and attitudes about infant feeding often differ from those of  
57  
58 mothers. [12,13]

59  
60 122

Previous studies on healthcare professionals' knowledge and attitudes

1  
2  
3 124 towards infant feeding have focused on milk feeding or timing of the  
4 introduction of complementary food. [14-17] To date no study has examined  
5  
6 126 attitudes to BLW in healthcare professionals working with young families.  
7  
8

9  
10 128 The aim of this content analysis study was to examine the knowledge of,  
11 attitudes to, and experiences with, BLW of healthcare professionals and of  
12  
13 130 mothers who had used this style of feeding with their infant.  
14

## 15 16 17 132 **METHODS**

### 18 19 **Participants**

20  
21 134 The participants were 31 healthcare professionals who were working with  
22 infants and families, and 20 mothers who had used BLW when introducing  
23  
24 136 solids to their infant. Mothers could be part of the study if they considered  
25 that they had used BLW, so BLW was self-defined.  
26

27  
28 138  
29 Participants were recruited by word of mouth (healthcare professional peer-  
30  
31 140 to-peer networks, parenting groups, La Leche League), email “snowballing”,  
32 or newspaper advertising. Twelve parenting groups were approached as a  
33  
34 142 starting point to recruit directly mothers who had tried BLW and to  
35 commence snowballing. Parenting groups were SPACE (supporting parenting  
36  
37 144 and child education) groups established to assist mothers (usually first-time  
38 mothers) with all aspects of parenting young children, and were not  
39  
40 146 specifically advocators of BLW, although BLW was a topic addressed through  
41 out the parenting program. Recruitment of the health professionals was  
42  
43 148 undertaken via established clinical relationships, and via snowballing through  
44 practice nurses. The study was approved by the Human Ethics Committee of  
45  
46 150 the University of Otago, Dunedin, New Zealand.  
47  
48

### 49 50 51 152 **Data collection**

52  
53 The data were collected during 2010 in Dunedin, New Zealand. Healthcare  
54  
55 154 professionals were interviewed at their place of work and mothers in their  
56 own home. The same researcher (SC) conducted all interviews, which  
57  
58 156 typically lasted 1 - 1.5 hours. Field notes were taken during the interviews  
59  
60

1  
2  
3 with healthcare professionals and extended immediately following the  
4 158 meeting. Interviews with mothers were tape-recorded and transcribed  
5  
6 verbatim.  
7

8 160  
9

### 10 Interview schedule and process

11 162 Two interview schedules, one for health professionals and one for parents,  
12 were developed from the existing literature about BLW [7,8,18] and the  
13 164 expert opinion of the authors (Table 1 and Table 2). As some healthcare  
14 professionals had not heard of BLW, a brief description of BLW was given at  
15 166 the start of the interview when necessary.  
16  
17

18 168 We used a semi-structured interview as outlined in Patton [19] to include, in  
19 the first part, a structured framework to cover the same basic lines of inquiry  
20 around knowledge, attitudes and experiences, for which participants could  
21 170 express their own ideas and understandings. The second part of the interview  
22 followed an unstructured format to allow for probing and further questioning  
23 of ideas or individual circumstances that were not included in the original  
24 172 interview outline.  
25  
26  
27  
28  
29  
30  
31  
32 174  
33  
34

35 **Table 1 Questions used in interviews with healthcare professionals**

- |    |  |
|----|--|
| 36 | 1. What is your professional role?   |
| 37 | 2. Have you heard of Baby-led Weaning (BLW)?   |
| 38 | 3. Where did you hear about BLW?   |
| 39 | 4. When did you hear about BLW?  |
| 40 | 5. If somebody asked you what BLW is, how would you describe it?                             |
| 41 | 6. What do you think of BLW as an alternative method for introducing solid foods to infants? |
| 42 | 7. Do you consider there may be benefits of BLW?   |
| 43 | 8. Do you consider there may be disadvantages of BLW?  |
| 44 | 9. Do you have any concerns about BLW?   |
| 45 |  |
| 46 |  |
| 47 |  |
| 48 |  |
| 49 |  |

50 176  
51  
52

53 **Table 2 Questions used in interviews with mothers who had used Baby-Led Weaning**

- |    |  |
|----|--|
| 54 | 1. If someone asked you: "What is Baby-Led Weaning (BLW)?" what would you tell them? |
| 55 | 2. How did you hear about BLW?   |
| 56 |  |
| 57 |  |
| 58 |  |
| 59 |  |
| 60 |  |

3. Why did you decide to try BLW?
  4. How old was your baby when you started BLW?
  5. How old is she now?
  6. How much of her food do you feed her and how much does she feed herself?
  7. Where did/do you get most of your information about BLW?
  8. What were the first foods you offered your baby?
  9. What form were the foods in that you first offered your baby?
  10. Were there any foods you avoided because you were using BLW?
  11. Did your baby eat at the same time as the rest of the family?
  12. Do you think your baby is a fussy or picky eater?
  13. Were you worried about BLW in any way?
  14. Did your baby gag on food?
  15. Was it food she had fed herself?
  16. Did your baby ever choke on food?
  17. Was it food she had fed herself?
  18. Do you consider there were advantages of BLW for you and your baby?
  19. Do you consider there were disadvantages of BLW for you and your baby?
  20. Overall, do you think BLW worked for you and your baby?
  21. Would you recommend other mothers try BLW?
  22. Do you have any useful tips for other mothers trying BLW?
- NB: "She" or "he" was used appropriately for the sex of the child.

178

### Data analysis

180 The main lines of inquiry (knowledge, attitudes and experiences) from the  
181 interviews were used as an initial guide in a directed content analysis [20],  
182 and are referred to here as categories. Content analysis [19] was performed  
183 on all interviews by reviewing all transcripts several times for recurring sub-  
184 categories (reviewing the two groups separately). Sub-categories were  
185 identified from manifest content (the visible, obvious components) [21],  
186 because the aim was to extract and report on the descriptive level of content  
187 and not to provide a deep level of interpretation and underlying meaning.  
188 Participants were recruited until we reached saturation of sub-categories,  
189 and we ensured that sub-categories were, as far as possible, defined so that  
190 they were exhaustive and mutually exclusive. Data analysis was led by one  
191 member of the research team (SC); and interpretation was verified during  
192 research team meetings (with RWT and ALH) to scrutinise sub-categories as

1  
2  
3 they were identified. Each category and its sub-categories have been  
4  
5 194 summarized, and illustrative quotes are included.  
6

## 7 8 196 **RESULTS**

9 Thirty-one healthcare professionals were interviewed, comprising: practice  
10  
11 198 nurses (n=11), Well-Child providers (a government funded service  
12 supporting families with young children and assessing health status, see:  
13  
14 200 <http://www.wellchild.org.nz/>) (n=4), dietitians (n=4), general practitioners  
15 (n=5), paediatricians (n=2), lactation consultants (n=2), midwives (n=2), and  
16  
17 202 a paediatric Speech-Language Therapist (n=1). The mothers were twenty  
18 mothers who had a child aged 8 – 24 months (mean=13 months).  
19

20  
21 204

### 22 **Healthcare Professionals**

23  
24 206 The sub-categories that emerged were remarkably consistent across the  
25 interviews with healthcare professionals.  
26

27  
28 208

### 29 **Knowledge**

30  
31 210 Nearly half (n=13/31) of the healthcare professionals had heard about BLW.  
32 Most of these had been introduced to the concept by their colleagues or  
33  
34 212 friends and family (rather than patients). The healthcare professionals who  
35 knew about BLW described it as the child feeding themselves whole foods,  
36  
37 214 instead of being spoon-fed purées. There was little discussion of other aspects  
38 of BLW.  
39

40  
41 216

### 42 **Attitudes**

43  
44 218 All healthcare professionals considered that BLW could be beneficial for the  
45 family and the child.  
46

47  
48 220

49 Healthcare professionals considered that **shared family mealtimes** would be  
50  
51 222 the main advantage of BLW. They were aware of the nutritional and  
52 psychological benefits of family meals and they envisaged family mealtimes  
53  
54 224 would be easier and more pleasant with BLW:  
55  
56  
57  
58  
59  
60

1  
2  
3  
4  
5 226 *The best thing is that an adult can eat their meal while the child is*  
6 *having theirs. There's no juggling trying to feed the baby while shoving a*  
7 *spoonful for yourself. (General Practitioner 3)*

8 228

9  
10 Some healthcare professionals thought **mealtime battles** would be less likely  
11 230 with BLW for two reasons: mothers would have an alternative approach to  
12 try if their child refused to be spoon-fed; and because BLW allows the child to  
13 eat at their own pace and stop when they have had enough, they would not be  
14 232 "bribed" or "forced" to eat food:

15  
16  
17  
18 234 *I think it's healthier that the baby is in control of what they eat... and you*  
19 *aren't forcing them to eat...there's far too many of us who just finish our*  
20 *plates instead of stopping when we are full. (Dietitian 2)*  
21 236

22  
23  
24  
25 238 Overall, healthcare professionals thought BLW would encourage healthier  
26 dietary behaviours by promoting a **wider variety of foods** and allowing the  
27 child to explore and learn about food at their own pace:  
28 240

29  
30 *Being able to look at it, hold it and see it as food, instead of slop must*  
31 *have advantages? (Paediatrician 2)*  
32 242

33  
34  
35 244 They also considered BLW would encourage **better appetite and self-**  
36 **regulation skills**, as mothers would be less able to control the child's food  
37 intake. They saw similarities between BLW and breastfeeding on demand  
38 246 and thought the two would complement each other well.

39  
40  
41  
42 248

43 A number of healthcare professionals who had children of their own thought  
44 BLW would be **more convenient** than the conventional method of spoon-  
45 250 feeding purées:

46  
47  
48  
49 252 *It sounds so much easier. Making purées is time consuming, and then*  
50 *they hardly eat anything and you have to throw it all out or you buy*  
51 *those jars of food, which are really expensive. (Dietitian 4)*  
52 254

53  
54  
55 256 Healthcare professionals suggested two **developmental advantages**: BLW  
56 might encourage better oral and chewing skills because the child is offered  
57  
58  
59  
60

1  
2  
3 258 pieces of food to eat so they may have more opportunity to develop their  
4 mouth and jaw movements instead of sucking food from a spoon as they do  
5  
6 260 with purées; and enhanced fine motor skills as the child has greater  
7 opportunities to manipulate food with their fingers and practice their fine  
8  
9  
10 262 motor movements:

11  
12 *The BLW method could have real advantages for coping with food and*  
13 264 *learning to eat i.e. for oral development. If babies are fed purées for too*  
14 *long they miss important windows for introducing different food*  
15 *textures. (Speech-Language Therapist 1)*  
16 266

17  
18  
19  
20 268 *There must be some sort of fine motor benefits for baby being able to*  
21 *play, essentially, with its food. (General Practitioner 5)*  
22

23 270

24  
25 However, in addition to these potential benefits, strong concerns about BLW  
26  
27 272 were also expressed.

28  
29  
30 274 **Choking** was a major concern expressed by many of the healthcare  
31 professionals, particularly those who had not observed BLW. The potential  
32  
33 276 risk of choking meant most healthcare professionals felt reluctant to  
34 recommend BLW:  
35

36  
37 278 *The potential for choking would make me feel very hesitant about giving*  
38 *my child whole food at 6 months. As a health professional I'd need to see*  
39 *some sound evidence before I could endorse this method [BLW].*  
40 280  
41 *(Dietitian 2)*  
42

43 282

44  
45 The specific concerns voiced regarding choking were that a 6 month old  
46  
47 284 infant would not be developmentally ready to chew whole pieces of food and  
48 that mothers may leave the infant alone in their highchair with their food.  
49  
50 286 Additionally healthcare professionals considered that mothers may become  
51 competitive about their infant's BLW progress, considering that their child is  
52  
53  
54 288 more advanced if they have certain foods or a greater variety of foods earlier  
55 than other children, and therefore might be motivated to offer unsafe foods  
56  
57 290 that would increase the child's risk of choking:  
58  
59  
60



1  
2  
3 *Just give the baby that food, she'll be fine. Sometimes it's almost like a*  
4 *challenge to see how they cope, another one of those competitive*  
5 292 *parenting things...oh look she's eating raw carrot at age 6 months.*  
6  
7  
8 294 *(Dietitian 1)*  
9

10  
11 296 However, one healthcare professional considered that BLW may work well  
12 for parents whose infant experiences feeding problems when spoon-feeding  
13  
14  
15 298 is used:

16 *I know of similar feeding methods which are often used with children*  
17  
18 300 *whose parents are having feeding difficulties with spoon-feeding and*  
19  
20 *these can work very well. (Speech-Language Therapist 1)*  
21

22 302

23 Healthcare professionals considered that there were two possible dietary  
24  
25 304 disadvantages with BLW: the potential for **growth faltering**, and for **poor**  
26  
27 **iron status**. There was concern that adopting BLW would mean forgoing any  
28  
29 306 iron-fortified infant cereal, and that a BLW diet would comprise low-energy  
30  
31 low-iron fruits and vegetables and include very few iron-rich foods. In  
32  
33 308 addition to low-energy foods, clumsy self-feeding (particularly at the  
34 beginning of BLW) might lead to growth faltering.

35 310 *"The two parents I know who have chosen BLW are offering only fruits*  
36 *and vegetables...Although fruits and vegetables are great foods, babies*  
37  
38 312 *need more nutrients... So I wonder how they would get these [nutrients]*  
39  
40 *if they were only having fruits and vege...nutrients could be limited..."*  
41  
42 314 *(General Practitioner 1)*  
43  
44

45 316 Contrasting this, a few healthcare professionals thought BLW infants could  
46  
47 consume energy beyond their needs as a result of **poor food choices**:

48  
49 318 *Young children arrive here and they're under two eating twisties [an*  
50 *extruded cereal snack], chocolate biscuits - would BLW be that for some*  
51  
52 320 *mothers? (Practice Nurse 2)*  
53  
54

55 322 At the other extreme, some healthcare professionals commented that mothers  
56  
57 (especially first-time mothers) are often apprehensive about their infant's  
58  
59  
60

1  
2  
3 324 growth and compare it to that of other infants and that a “chubby” or “bonny”  
4 baby is viewed as healthy even when it reflects overweight or obesity. Some  
5  
6 326 healthcare professionals suggested BLW may **increase parental anxiety**.  
7  
8 They thought mothers would struggle watching their infant learn to eat,  
9  
10 328 especially at the start when they might eat very little:

11 *Parents expect to see their child growing consistently - linear growth -*  
12 *and if they do not this evokes anxiety. How would you know if the child*  
13 *was eating enough? Parents would not cope with the child playing with*  
14 *food and not eating it. (Practice Nurse 7)*  
15  
16 332

17  
18  
19  
20 334 Finally, some healthcare professionals thought BLW would be **messy** and for  
21 the mothers and suggested that there would be a lot of food wasted, which  
22  
23 336 many mothers would not tolerate:

24 *I could imagine in the first couple of weeks that the infant wouldn't eat*  
25 *much and that there would be an awful lot of playing and squashing.*  
26 338 *Some mothers may not be able to cope with this. (Practice Nurse 11)*  
27  
28

29  
30 340  
31  
32 *I would be concerned about the mess and wastage of food. Some of our*  
33 342 *families live on a very tight food budget and I've seen the mess when*  
34 *doing BLW and I think a lot of food gets wasted.” (Well Child Provider 1)*  
35  
36

37 344

## 346 **Mothers**

347 The sub-categories that emerged were very consistent across the interviews  
348 with mothers.

349  
350 350 Most mothers (n=18/20) started BLW when their child was 5.5 - 6 months of  
351 age and all mothers had exclusively breastfed their child up until this age. The  
352 BLW approach advises mothers to watch for signs of developmental  
353 readiness before introducing their child to solid food. However most mothers  
354 354 recalled starting solids at an age based on advice from their healthcare  
355 professional or because they were following the WHO guidelines, although a  
356  
357  
358  
359  
360

1  
2  
3 356 small number (n=2/20) of mothers started solids when their infant started  
4 reaching out for food.  
5

6 358

7  
8 The most commonly offered first foods were vegetables (steamed or boiled  
9 pumpkin, potato, kumara (New Zealand sweet potato), broccoli, carrot)  
10 360 (n=13/20) and fruit (avocado, banana) (n=11/20). Most mothers (n=16/20)  
11 reported that their child shared every meal with one or more family  
12 members. Mothers liked that their child could feed themselves with BLW,  
13 362 however many (n=15/20) also reported some spoon-feeding, although this  
14 was infrequent or only in unusual circumstances, such as when their child  
15 was sick. Mothers reported doing this to avoid mess, to increase iron intake  
16 366 by spoon-feeding iron-fortified infant cereal, or to increase energy intake  
17 especially when their infant was sick or appeared too tired to self-feed.  
18  
19  
20  
21  
22  
23 368  
24  
25

### 26 370 **Knowledge**

27  
28 The majority of mothers defined BLW as having 3 main components: offering  
29 372 finger-sized pieces of food, allowing the child to be in control of how much  
30 they ate, and not spoon-feeding purées:  
31

32  
33 374 *Letting your baby lead in terms of the pace and amount of solids*  
34 *eaten...offering them whole, safe foods when they are physically ready to*  
35 *feed themselves... keeping milk [breast/formula] as their main food*  
36 376 *source until they naturally increase the amount they eat and drop milk*  
37 *feeds on their own. (Mother 2)*  
38  
39  
40 378  
41  
42

43 380 Nearly half of the mothers first heard about BLW through a parenting group  
44 while others had discovered it online or were told about it by their Well-Child  
45 provider. One mother had not heard of the term “Baby-Led Weaning” but said  
46 382 “it was instinctive” to offer her child pieces of food and allow them to feed  
47 themselves. The majority of mothers obtained their BLW information from  
48 384 online sources, drawing on other mothers’ experiences through blogs, threads  
49 and forums.  
50  
51  
52  
53 386  
54

### 55 388 **Attitudes**

1  
2  
3 The main reason mothers chose to follow BLW was because it “*made sense*”  
4 390 and “*seemed logical*”. Lifestyle reasons also motivated mothers to follow  
5  
6 BLW. They considered that BLW was **less time consuming** and **less**  
7  
8 392 **expensive** than making puréed food:

9  
10 *With three other children, I was way too busy to prepare special foods i.e.*  
11 394 *purées and also I didn't want to buy them - they're expensive. (Mother*  
12 *15)*

13  
14  
15 396  
16  
17 Mothers considered that there were advantages of BLW during the  
18 398 complementary feeding period, and also in the future. During the  
19  
20 complementary feeding period, mothers reported **less meal preparation**  
21 400 (the baby ate what the family was eating, there was no purée preparation)  
22  
23 and **reduced mealtime stress** because they were not spoon-feeding the baby  
24  
25 402 and eating their own meal simultaneously. Some mothers (n=6/20) reported  
26  
27 it was liberating that BLW does not include a detailed step-by-step weaning  
28  
29 404 protocol and instead **promotes responding to the infant** and thought that  
30  
31 fewer “rules” made the **transition to food less frightening and**  
32 406 **complicated**:

33  
34 *With my first child I became so worried about getting the food*  
35 408 *[purées] to exactly the right consistency. It [BLW] made sense to me,*  
36  
37 *because she was demand fed so it seemed like the natural*  
38  
39 410 *progression. (Mother 8)*

40  
41  
42 412 In addition mothers believed that BLW had encouraged their child to develop  
43  
44 healthier eating behaviours, for example being **able to respond**  
45 414 **appropriately to hunger and satiety cues**, sharing **family meals** and eating  
46  
47 a **wider variety of foods**:

48  
49 416 *I felt it would give my daughter the opportunity to experience, from the*  
50  
51 *outset, everything that is pleasurable about food, the textures, colours,*  
52  
53 418 *individual tastes...a lovely way to have them be a real participant in the*  
54  
55 *meal – eating what we eat, copying us, and really joining in...not being*  
56 420 *fed separately. (Mother 2)*

1  
2  
3 422 Most mothers had no concerns with BLW (n=15/20). Those mothers who did  
4 have concerns were worried about the appropriateness of certain foods, for  
5  
6 424 example raw apple. Current guidelines on types of BLW foods to offer are  
7  
8 incomplete and some mothers reported **not knowing what foods to offer** at  
9  
10 426 what age:

11  
12 *I wasn't worried but a bit concerned that some of the advice was*  
13 428 *conflicting e.g. the book says apple is fine and people I've spoken to who*  
14 *have used BLW have said no apples. (Mother 7)*  
15

16  
17 430

18 One mother was concerned about her infant's **iron intake**, so she spoon-fed  
19  
20 432 her infant iron fortified rice cereal daily while following BLW. Other mothers  
21 felt that the iron from breast milk would be adequate until the infant started  
22  
23 434 eating high iron meat or meat alternatives:

24  
25 *Solids are just a taste and texture thing, breast milk or formula being*  
26 436 *their main nutrition until 9 months, so don't worry if your baby takes*  
27 *their time adjusting to solids. (Mother 6)*  
28

29  
30 438

31  
32 Nearly all mothers (n=19/20) reported that their infant gagged on food. Some  
33  
34 440 mothers had completed a first aid course prior to their infant starting BLW to  
35 equip themselves for dealing with gagging or choking. **Gagging was not a**  
36  
37 442 **concern** to mothers, instead they considered it was a natural part of a child  
38 learning to eat and adapting to new textures that are quite different to milk.  
39  
40 444 Mothers were aware that an infant's gag reflex is much further forward on  
41 their tongue when they first start eating and because of this, they understood  
42  
43 446 gagging was highly likely:

44  
45 *I felt like I was really prepared, I had read the book [4] so knew about*  
46 448 *gagging and choking and that mostly it is gagging because the baby's*  
47 *gag reflex is much further forward than an adult's...gagging is a very*  
48  
49 450 *important learning process. (Mother 12)*  
50

51  
52 Mothers viewed gagging as an innate safety mechanism that is activated when  
53  
54 452 food has not been sufficiently chewed for swallowing. One parent explained  
55 that gagging returned the food to the front of the mouth for further chewing  
56  
57 454 and that if the infant did not gag then the food could cause obstruction and  
58  
59  
60

possibly choking.

456

Mothers were aware **choking** was a common criticism of BLW, and although most reported that choking did not occur, 30% (n=6/20) reported one or more episodes. Although choking can be very serious, all mothers who reported choking (n=6/20) reported that the infant independently dealt with the choking by expelling the food from their mouth through coughing and mothers did not have to intervene with first aid. All mothers who could recall the food that was responsible (n=4/6) reported that raw apple was the food their infant had choked on. Mothers expressed feeling more relaxed around four weeks after introducing complementary foods; they saw that their infant could manage different textures, and was developing more coordinated eating skills. Mothers also felt that by this time the difference between gagging and choking was more obvious and that they realised it was mostly gagging.

470 Many of the mothers reported that **mealtime mess** was the main disadvantage of BLW. Infants were able to pick up their food and “squash, smear and throw it”. Some mothers were apprehensive about their infant eating in public or at other people’s homes because of the mess. Mess was more of a problem in the early phases of BLW when the infant had not mastered the coordination skills needed to get food to their mouth, and mothers said as the level of skill improved the mess declined. Mothers who also had experience with the conventional method of starting solids thought finger foods and self-feeding were messy whatever the age:

480 *As someone who’s done it both ways [BLW and spoon-feeding], I think they’re both pretty messy and wasteful! (Mother 5)*

482 Some mothers recalled feeling impatient during the first month of BLW as their infant, while learning to eat, could spend **long periods of time at the table** and appear to be “*playing with food*”. Additionally mothers reported that **some family meals were not appropriate** for their baby and that at these times knowing what to offer the infant was a challenge:

1  
2  
3  
4  
5 488 *I struggled with the “baby eats what the family eats” concept... Most of*  
6  
7  
8 490 *what we really eat has a lot of salt, sugar, sauces, etc in it, and it takes*  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22 498 *work to think of how to adjust it or intervene in the cooking process to fit*  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

*baby. (Mother 5)*

492 Mothers recalled encountering both positive and negative experiences during  
the BLW period, however all the mothers concluded that they would  
494 recommend BLW to other mothers:

496 *I couldn't imagine any other way of introducing solids and will certainly*  
498 *do BLW with any future children. I think the fact that our son has*  
*control over eating means that he doesn't have to fight for control...food*  
*is not a battleground here. (Mother 19)*

500 Two mothers added that they would recommend supplementing BLW with  
some spoon-feeding for reassurance about nutrients:

502 *I say to people to use a combination. I felt good about this because she*  
504 *was able to explore food and learn about it but at the same time get the*  
*nutrients that she needed. (Mother 15)*

## 506 Experiences

508 Table 3 presents practical recommendations mothers offered for overcoming  
challenges when using BLW.

510

**Table 3 Practical recommendations from mothers for successful Baby-Led Weaning**

Practical recommendation	Supporting quote
Place a large cloth under the infant's highchair to collect spilled food - the cloth could be shaken outside and washed in the machine.	<i>“Prepare for mess with bibs, strip the child, messy mats, have a washcloth handy, a hungry dog to eat scraps helps too and then relax and let them go for it.”</i>
Use full cover (sweatshirt) bibs.	
In the warmer (summer) months the family could try eating outside.	

<p>Put the infant in their highchair with their nappy on. Then follow with a bath to wash off any food mess.</p>	
<p>Put infant in the highchair in the kitchen so they can begin their meal while the family meal is being prepared and interact with them while they are eating.</p>	<p><i>"Watch your baby but don't interfere, I wouldn't like someone picking food off my plate and putting it into my mouth because they thought I was eating too slowly. Not to worry too much about quantities – remembering that milk is still on offer."</i></p>
<p>Seek advice from parenting groups and others doing BLW. Collect and share food and recipe ideas.</p>	<p><i>Sometimes you get stuck for ideas of what to offer and talking to others doing BLW can get the creativity going again... It's amazing how many ways there are to cook and present food.</i></p>
<p>Mothers, whether following BLW or not, should complete a first aid course. This should teach the difference between gagging and choking, and can improve confidence for dealing with choking (if it occurs).</p>	<p><i>"Go to a first aid course, preferably one targeted at parents. This will give you confidence to deal with choking if it happens."</i></p>
<p>Have realistic expectations about mess and your infant's eating progress. Mothers need to appreciate that starting solids is a transition period which may last many months.</p>	<p><i>"Don't think that things will be heaps easier in the short-term than the conventional way. A baby with finger food will still need a lot of support, because they'll drop things a lot and need you to pick them up."</i></p>
<p>Try and enjoy the BLW experience by allowing the baby to explore food and have fun with eating.</p>	<p><i>"Don't stress about the quantities they eat, the mess they make or the seemingly frequent gagging episodes."</i></p>

512

## DISCUSSION

514 Although anecdotal reports suggest that the use of BLW is increasing, fewer  
 515 than half of the healthcare professionals in the current study had heard about  
 516 this approach. Those who were aware of BLW had limited knowledge of the  
 517 details and were not aware of all the practices promoted as part of BLW. [4,5]  
 518 Healthcare professionals suggested potential benefits of BLW (greater  
 519 opportunity for shared family meal times, fewer mealtime battles, healthier  
 520 eating behaviours, greater convenience, and possible developmental  
 521 advantages) but most felt reluctant to recommend it because of their concern



1  
2  
3 522 about the potential increased risk of choking. Most healthcare professionals  
4 had not seen BLW in action and therefore had difficulty understanding how a  
5  
6 524 6-month-old infant could possess the mastication and coordination skills  
7  
8 needed to safely manage whole pieces of food.  
9

526

10  
11 Overall, mothers reported that using BLW had been a positive experience,  
12  
13 528 that they recommended it to other mothers, and would follow it again if they  
14 had another child. Interestingly, many of the mothers in this study did not  
15  
16 530 follow BLW strictly as outlined by Rapley [4]. Although they generally  
17 embraced BLW techniques, many also reported using a small amount of  
18  
19 532 spoon-feeding. This suggests that, in practice, many parents following a BLW  
20 approach are probably somewhere along the continuum of some spoon-  
21  
22 534 feeding to total self-feeding, albeit much more at the latter end. As well as it  
23 being described as the “*logical way*” to introduce complementary foods,  
24  
25 536 mothers reported that BLW was less time consuming, involved less meal  
26 preparation, caused less stress, and resulted in fewer mealtime battles.  
27  
28 538 Although some mothers struggled with drawn out mealtimes and the food  
29 mess created by the self-feeding infant, these disadvantages did not  
30  
31 540 discourage these mothers from following BLW. Furthermore, mothers who  
32 had previously used the conventional method (spoon-feeding purées) with  
33  
34 542 one of their older children considered both approaches (BLW and  
35 conventional) to be messy.  
36  
37  
38  
39

544

40  
41 Healthcare professionals and mothers’ attitudes toward BLW were similar, in  
42  
43 546 some respects. Both agreed that BLW may promote shared family meals,  
44 reduce mealtime battles, and be more convenient than spoon-feeding purées,  
45  
46 548 they also agreed that the mess produced when an infant self-feeds could be  
47 substantial. Furthermore, both groups considered BLW could encourage  
48  
49 550 healthier eating patterns, including better self-regulation of energy intake.  
50  
51 However, there were some noticeable differences in the attitudes of the two  
52  
53 552 groups, particularly concerning safety and nutrient sufficiency. Healthcare  
54 professionals had serious concerns about potential choking and low iron  
55  
56 554 intake, as well as the ability of an infant to self-feed at 6 months. Although  
57  
58  
59  
60

1  
2  
3 some mothers had considered the potential problems raised by healthcare  
4  
5 556 professionals they were not as concerned by these. Moreover, they reported  
6  
7 that these concerns decreased as they followed BLW and their baby appeared  
8  
9 558 happy and healthy.

10  
11 560 The healthcare professionals' concern about a possible increased risk of  
12  
13 choking aligns with opinions expressed by other healthcare professionals.[5]  
14  
15 562 [22,23] Choking is more likely with very hard foods such as raw apple or  
16  
17 round coin-shaped foods such as sausage. [24] Children develop the ability to  
18  
19 564 chew before they develop the ability to hold food in their mouth or to move it  
20  
21 backwards for swallowing. [25] At about 6 months of age, infants develop a  
22  
23 566 munching type oral-motor action; this movement, in conjunction with the  
24  
25 ability to sit unsupported, promotes swallowing of thicker, chunkier pieces of  
26  
27 568 food. [26] The founder of BLW, Gill Rapley, disputes that a healthy 6-month-  
28  
29 old infant would be at increased risk of choking with BLW. [4,5] Rapley  
30  
31 570 acknowledges gagging is common with BLW because at 6 months of age the  
32  
33 baby's gag reflex is further forward on their tongue than it is at 1 year. [5]  
34  
35 572 However, based on her personal observations, Rapley considers choking is  
36  
37 more likely with spoon-feeding because the baby learns to use suction to take  
38  
39 574 the purée from the spoon, which causes food to be taken to the back of the  
40  
41 throat where it is swallowed, encouraging the infant to learn to swallow food  
42  
43 576 without chewing first. [5]

44  
45 578 Interestingly most mothers in the current study were not concerned about  
46  
47 choking. Although some had initial concerns, these quickly diminished when  
48  
49 580 they witnessed how proficient their infant was at bringing food forward and  
50  
51 expelling it out of their mouth if needed, and all mothers felt prepared for  
52  
53 582 dealing with a choking incident if it happened. Others have reported similar  
54  
55 findings with mothers following BLW initially being concerned about choking  
56  
57 584 but over time becoming less nervous and more able to distinguish between  
58  
59 the action of gagging to move food and actual choking. [27] Furthermore  
60  
586 93.5% of the BLW group in the recent study by Townsend and Pitchford[9]  
reported never having experienced a choking incident. It is of concern,

1  
2  
3 588 however, that in the current study, 30% of mothers reported at least one  
4 choking incident, most with raw apple. No serious incidents were reported  
5  
6 590 and this raises the question of whether mothers correctly identified choking  
7 or whether they had instead witnessed the less serious action of gagging.  
8  
9 592 However, given that raw apple was the cause of most reported choking  
10 incidents, and fulfills the criteria of a high-risk food, being hard and in small  
11 pieces when bitten, it would be sensible to discourage parents who are  
12 following BLW from offering raw apple to their infant.  
13  
14  
15

16 596  
17  
18 Healthcare professionals expressed concern about whether BLW infants  
19  
20 598 would be able to consume sufficient iron. In New Zealand, spoon-feeding iron-  
21 fortified baby rice cereal is a popular way for mothers to increase their  
22 infant's iron intake. Healthcare professionals in this study quickly recognized  
23 600 that this would not be possible with BLW and they speculated that this would  
24 put the infant at risk of suboptimal iron status, which is already a concern for  
25 many New Zealand infants (6.9% having iron deficiency anaemia, and a  
26 further 12.5% having suboptimal iron status[28]). Most mothers in the  
27 602 present study believed that the breast milk their infant was receiving would  
28 supply enough iron until meat or other high-iron meat alternatives were  
29 introduced. Similarly, mothers from Brown and Lee[27] were not concerned  
30 604 about iron intake. Although healthy, term, normal birth weight infants are  
31 considered to obtain enough iron from their mother's breast milk and from  
32 the redistribution of iron from haemoglobin to iron stores during the first six  
33 606 months of life, [29] from six months of age, iron becomes a critical nutrient  
34 and all infants should receive iron-rich complementary foods such as meat,  
35 meat alternatives or iron-fortified foods. [2,29] [30-32]  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46

47 614  
48  
49 Many of the healthcare professionals were not convinced that a 6-month old  
50 616 infant could eat enough to keep pace with growth when self-feeding,  
51 particularly in the early days of complementary feeding. Only one study  
52 618 appears to have examined this, and suggested that there may be an increased  
53 incidence of underweight in BLW children (3/63) compared to spoon-fed  
54 620 children (0/63), although most children were of normal weight, and as  
55  
56  
57  
58  
59  
60

1  
2  
3 acknowledged by the authors, the numbers were small, and the cases and  
4  
5 622 controls drawn from different populations. It has been suggested that purées  
6  
7 (which are frequently made of fruit or vegetables and thinned down with  
8  
9 624 water or milk) are often very low in energy, meaning that the small volume of  
10  
11 purées typically consumed in the early weeks would contribute relatively  
12  
13 626 little to meeting a conventionally fed infant's nutrient requirements. [7] In  
14  
15 contrast, finger foods, if carefully chosen, can be very nutrient dense, so an  
16  
17 628 infant who appears to be eating little when self-feeding may potentially be  
18  
19 closer to meeting their nutrient requirements. [7] Only one parent in the  
20  
21 630 current study reported being concerned about her child being able to eat  
22  
23 enough, although many mothers reported spoon-feeding their infant at times  
24  
25 632 when they were potentially at greater risk of under eating, i.e. when they  
26  
27 were unwell or very tired. Because of the nature of this self-selected sample it  
28  
29 634 is possible that mothers with concerns about this issue may have  
30  
31 discontinued or chosen not to follow BLW. At this point, no research has  
32  
33 636 examined the actual food and nutrient intake of children following a BLW  
34  
35 approach compared with a more traditional method of infant feeding.  
36  
37

38  
39 638  
40  
41 The healthcare professionals and mothers who took part in the current study  
42  
43 640 were self-selected. Furthermore, the sample size was small. Although this  
44  
45 study is not intended to present representative results given its qualitative  
46  
47 642 nature, participants were recruited in a number of different ways, and the  
48  
49 interviews were continued until well after saturation for both healthcare  
50  
51 644 professionals and mothers, suggesting that the majority of views of BLW in  
52  
53 these groups are likely to have been captured. The first author conducted the  
54  
55 646 content analysis of the transcripts, and although the co-authors discussed the  
56  
57 interpretation of individual participant quotes, they did not conduct a  
58  
59 648 separate full analysis of the transcripts. However, we consider that this was  
60  
61 sufficient to ensure that the findings are trustworthy, both because our aim  
62  
63 was to capture manifest (i.e. description of the visible, obvious components),  
64  
65 650 rather than latent (i.e. interpretation of underlying meaning) content [33], and  
66  
67 because we have provided direct participant quotes for each sub-category so  
68  
69 that the reader can judge for themselves the appropriateness of the coding.  
70

654

Although there was some agreement between healthcare professionals and mothers that BLW was likely to lead to more shared family meals, fewer mealtime battles, potentially healthier eating patterns, and to be more convenient, although messy, the healthcare professionals were, overall, reluctant to recommend the method. They were concerned that BLW could potentially increase choking and adversely affect the infant's iron status and energy intake. In this context, it is interesting that the UK Department of Health has supported the inclusion of some hand-held first foods in their most recent recommendations for infant feeding. [34,35] Undoubtedly, further research of BLW is warranted especially concerning its potential to positively influence eating behaviours, as well as its safety and nutrient sufficiency.

666

**Acknowledgements** We would like to thank all the families and healthcare professionals who contributed to this study.

668

**Contributors** SC, ALH and RWT were all involved with the conception and design of the study, the analysis and interpretation of the data and the writing and editing of this paper. SC conducted the interviews with participants and was responsible for the analysis and interpretation of the data. SC wrote the first draft of the paper, and A-L H and RWT made important intellectual contributions to the content and approved the final version.

674

**Funding** This research was conducted using the authors' (RWT) resources and received no specific grant from any funding agency in the public, commercial or non-profit sectors.

676

**Competing interests** None.

678

**Ethical approval** Ethical approval was obtained from the University of Otago Ethics Committee.

680

**Provenance and peer review** Not commissioned.

682

**Data sharing statement** No additional data are available.

## 684 REFERENCES

- 686
- 688 1. World Health Organization. Infant and young child feeding: model chapter  
for textbooks for medical students and allied health professionals.  
Geneva, Switzerland: World Health Organization, 2009.
- 690 2. Ministry of Health. *Food and Nutrition Guidelines for Healthy Infants and  
Toddlers (Aged 0-2): A background paper (4th Ed)*. Wellington: Ministry  
692 of Health, 2008.
- 694 3. Department of Health (DoH). *Infant Feeding*. London, UK: Department of  
Health, 2003.
- 696 4. Rapley G, Murkett T. *Baby-Led Weaning: Helping your child love good food*.  
London: Vermilion, 2008.
- 698 5. Rapley G. Baby-led weaning: transitioning to solid foods at the baby's own  
pace. *Community Pract* 2011;84(6):20-23.
- 700 6. Sachs M. Baby-led weaning and current UK recommendations - are they  
compatible? *Matern Child Nutr* 2011;7:1-2.
- 702 7. Wright CM, Cameron K, Tsiaka M, Parkinson KN. Is baby-led weaning  
feasible? When do babies first reach out for and eat finger foods?  
*Matern Child Nutr* 2011;7(1):27-33.
- 704 8. Brown A, Lee M. Maternal control of child feeding during the weaning  
period: differences between mothers following a baby-led or standard  
706 weaning approach. *Matern Child Health J* 2011;15(8):1265-71.
- 708 9. Townsend E, Pitchford N. Baby knows best? The impact of weaning style on  
food preferences and body mass index in early childhood in a case-  
controlled sample. *BMJ Open* 2012;2:1.
- 710 10. Abel S, Park J, Tipene-Leach D, Finau S, Lennan M. Infant care practices in  
New Zealand: a cross-cultural qualitative study. *Soc Sci & Med*  
712 2001;53(9):1135-48.
- 714 11. Campbell ND, Soeken KL, Rankin EAD. Infant Weaning Patterns and  
Related Maternal-Infant Health Outcomes. *Public Health Nurs*  
716 1986;3(1):57-63.
- 718 12. Arden MA. Conflicting influences on UK mothers' decisions to introduce  
solid foods to their infants. *Matern & Child Nutr* 2010;6(2):159-73.
- 720 13. Wright C, Parkinson K, Drewett R. Why are babies weaned early? Data  
from a prospective population based cohort study. *Arch Dis Child*  
722 2004;89(9):813-16.
- 724 14. Hellings P, Howe C. Assessment of Breastfeeding Knowledge of Nurse  
Practitioners and Nurse-Midwives. *J Midwifery Womens Health*  
726 2000;45(3):264-70.
- 728 15. Freed GL, Clark SJ, Lohr JA, Sorenson JR. Pediatrician involvement in  
breast-feeding promotion: a national study of residents and  
730 practitioners. *Pediatrics* 1995;96(3 Pt 1):490-4.
- 732 16. Freed GL, Clark SJ, Sorenson J, Lohr JA, Cefalo R, Curtis P. National  
assessment of physicians' breast-feeding knowledge, attitudes,  
training, and experience. *JAMA* 1995;273(6):472-6.
17. Schanler RJ, O'Connor KG, Lawrence RA. Pediatricians' practices and  
attitudes regarding breastfeeding promotion. *Pediatrics*  
1999;103(3):E35.

- 1  
2  
3  
4 734 18. Brown A, Lee M. A descriptive study investigating the use and nature of  
5 baby-led weaning in a UK sample of mothers. *Matern Child Health J*  
6 2011;7(1):34-47.  
7 736 19. Patton MQ. *Qualitative Research and Evaluation Methods*. 3rd ed.  
8 Thousand Oaks, California Sage Publications, Inc., 2002.  
9 738 20. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis.  
10 *Qualitative health research* 2005;15(9):1277-88.  
11 740 21. Kondracki NL, Wellman NS, Amundson DR. Content analysis: review of  
12 methods and their applications in nutrition education. *Journal of*  
13 742 *nutrition education and behavior* 2002;34(4):224-30.  
14 22. Dietitians NZ Paediatric SIG convenor. Dietitians NZ Paediatric Special  
15 744 Interest Group Newsletter. In: NZDA, editor. May ed, 2010.  
16 23. Rowell K and Becker H. baby-led-weaning-or-starting-solids-book-review-  
17 746 and-nutritionist-weighs-in-with-her-7-month-old-daughter.  
18 <http://thefeedingdoctor.com>, 2011.  
19 748 24. Byard RW, Gallard V, Johnson A, Barbour J, Bonython-Wright B, Bonython-  
20 Wright D. Safe feeding practices for infants and young children. *J*  
21 750 *Paediatr Child Health* 1996;32(4):327-9.  
22 25. Naylor A, Morrow A. *Developmental readiness of normal full term infants to*  
23 752 *progress from exclusive breastfeeding to the introduction of*  
24 *complementary foods: reviews of the relevant literature concerning*  
25 *infant immunologic, gastrointestinal, oral motor and maternal*  
26 754 *reproductive and lactational development*. Washington DC: Wellstart  
27 International, LINKAGES Project Academy for Educational  
28 756 Development, 2001.  
29 758 26. Pridham KF. Feeding behavior of 6-to 12-month-old infants: Assessment  
30 and sources of parental information. *J Pediatr* 1990;117(2(Pt 2)):S174-  
31 760 80.  
32 27. Brown A, Lee M. An exploration of experiences of mothers following a  
33 762 baby-led weaning style: developmental readiness for complementary  
34 foods. *Matern Child Health J* 2011.  
35 764 28. Soh P, Ferguson EL, McKenzie JE, Homs MY, Gibson RS. Iron deficiency and  
36 risk factors for lower iron stores in 6-24-month-old New Zealanders.  
37 766 *Eur J Clin Nutr* 2004;58(1):71-79.  
38 29. Domellof M. Iron requirements in infancy. *Ann Nutr Metab* 2011;59(1):59-  
39 768 63.  
40 30. Leong W-I, Lönnerdal B. Iron Nutrition. In: Anderson G, McLaren G,  
41 770 editors. *Iron Physiology and Pathophysiology in Humans*: Humana  
42 Press, 2012:81-99.  
43 772 31. Kramer MK, R. Optimal duration of exclusive breastfeeding. *Cochrane*  
44 *database of systematic reviews* 2002(1):CD003517.  
45 774 32. World Health Organization. Guiding Principles For Complementary  
46 Feeding of the Breastfed Child. Geneva, Switzerland, 2004.  
47 776 33. Graneheim UH, Lundman B. Qualitative content analysis in nursing  
48 research: concepts, procedures and measures to achieve  
49 trustworthiness. *Nurse Educ Today* 2004;24(2):105-12.  
50 778 34. Department of Health. Start4Life: No Rush to Mush.  
51 <http://www.nhs.uk/start4life/pages/no-rush-to-mush.aspx>, 2009.  
52 780  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3 35. National Health Service (NHS). Your baby's first solid foods.

4 782 [http://www.nhs.uk/Conditions/pregnancy-and-baby/Pages/solid-  
6 foods-weaning.aspx](http://www.nhs.uk/Conditions/pregnancy-and-baby/Pages/solid-<br/>5 foods-weaning.aspx): NHS, 2011.

7 784  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of cross-sectional studies

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study’s design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2,3&4
Objectives	3	State specific objectives, including any prespecified hypotheses	2
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	2&5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	N/A
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5&6
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	6&7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	N/A
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	N/A
		(b) Describe any methods used to examine subgroups and interactions	N/A
		(c) Explain how missing data were addressed	N/A
		(d) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
<b>Results</b>			

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	7
		(b) Indicate number of participants with missing data for each variable of interest	N/A
Outcome data	15*	Report numbers of outcome events or summary measures	N/A
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	N/A
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	17
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	21
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	18-21
Generalisability	21	Discuss the generalisability (external validity) of the study results	21-22
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	22

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).