

# A Baby-Led Approach to Eating Solids and Risk of Choking

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abstract

**OBJECTIVE:** To determine the impact of a baby-led approach to complementary feeding on infant choking and gagging.

**METHODS:** Randomized controlled trial in 206 healthy infants allocated to control (usual care) or Baby-Led Introduction to Solids (BLISS; 8 contacts from antenatal to 9 months providing resources and support). BLISS is a form of baby-led weaning (ie, infants feed themselves all their food from the beginning of complementary feeding) modified to address concerns about choking risk. Frequencies of choking and gagging were collected by questionnaire (at 6, 7, 8, 9, 12 months) and daily calendar (at 6 and 8 months); 3-day weighed diet records measured exposure to foods posing a choking risk (at 7 and 12 months).

**RESULTS:** A total of 35% of infants choked at least once between 6 and 8 months of age, and there were no significant group differences in the number of choking events at any time (all *P*s > .20). BLISS infants gagged more frequently at 6 months (relative risk [RR] 1.56; 95% confidence interval [CI], 1.13–2.17), but less frequently at 8 months (RR 0.60; 95% CI, 0.42–0.87), than control infants. At 7 and 12 months, 52% and 94% of infants were offered food posing a choking risk during the 3-day record, with no significant differences between groups (7 months: RR 1.12; 95% CI, 0.79–1.59; 12 months: RR 0.94; 95% CI, 0.83–1.07).

**CONCLUSIONS:** Infants following a baby-led approach to feeding that includes advice on minimizing choking risk do not appear more likely to choke than infants following more traditional feeding practices. However, the large number of children in both groups offered foods that pose a choking risk is concerning.



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Ms Fangupo compiled the choking data, carried out the initial analyses on choking, and drafted the initial manuscript; Dr Heath and Associate Professor Rachael Taylor are the principal investigators of the BLISS randomized controlled trial, conceptualized and designed this aspect of the study, and reviewed and revised the manuscript; Associate Professor Williams designed and undertook all statistical analyses, and critically reviewed the manuscript; Ms Morison and Ms Erickson Williams collected and analyzed the diet records under the supervision of Ms Fleming, and all three critically reviewed the manuscript; Dr Wheeler and Professor Barry Taylor provided pediatric expertise and critically reviewed the manuscript; and all authors approved the final manuscript as submitted.

This trial has been registered with the Australian New Zealand Clinical Trials Registry (<http://www.anzctr.org.au>) (identifier ACTRN12612001133820).

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**WHAT'S KNOWN ON THIS SUBJECT:** Although baby-led approaches to infant feeding, in which infants feed themselves all their foods from the start of complementary feeding, are increasingly popular, concern has been expressed that this alternative feeding approach may increase the risk of food-related choking.

**WHAT THIS STUDY ADDS:** Infants following a modified version of baby-led weaning did not choke more often than infants following traditional feeding practices, suggesting baby-led approaches to introducing solids can be as safe as traditional methods. However, unsafe practices were apparent in both groups.

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Complementary feeding usually starts with puréed foods that are spoon-fed to the infant.<sup>1-3</sup> However, an alternative approach, called baby-led weaning (BLW), appears to be growing in popularity.<sup>4</sup> In BLW, infants feed themselves all their foods, in the form of graspable pieces, from the start of complementary feeding.<sup>5</sup> Although BLW has several proposed advantages,<sup>6,7</sup> concern has been expressed about the safety of baby-led approaches, particularly whether they may increase the risk of food-related choking.<sup>8,9</sup> Advocates of BLW suggest that choking is no more likely than in spoon-fed infants, providing basic safety rules are followed (eg, infant is seated in an upright position and in control of what is put in his or her mouth), although gagging may be more common.<sup>5,6</sup>

Despite considerable interest in BLW from health professionals, parents, and policymakers,<sup>4,10</sup> only 2 small studies have investigated whether baby-led approaches increase the risk of choking.<sup>11,12</sup> Analysis of 3-day diet records indicated that BLW infants were not offered foods posing a choking risk more often than infants following traditional spoon-feeding, but the small sample size and wide confidence interval (CI) suggest caution in interpreting the data.<sup>11</sup> A small survey reported no difference in the proportion of infants who had ever choked (31% in traditionally fed infants, 31%–40% in BLW), but the study was not powered to identify differences in choking.<sup>12</sup>

The Baby-Led Introduction to Solids (BLISS) study was designed primarily to determine whether a modified version of BLW was a suitable obesity prevention initiative in infancy.<sup>13</sup> Because the BLISS modifications specifically addressed choking risk, the aim of the current study was to determine whether this modified baby-led approach to complementary feeding altered the risk of choking

and gagging in infants compared with traditional spoon-feeding.

## METHODS

BLISS was a 2-year randomized controlled trial (commenced 2013), approved by the New Zealand Lower South Regional Ethics Committee (LRS/11/09/037). Because a detailed protocol<sup>13</sup> and pilot study<sup>14</sup> have been published, only relevant information is provided here. Pregnant women were eligible if they booked with the local maternity unit before 34 weeks' gestation, were  $\geq 16$  years of age, spoke English or Te Reo Māori (indigenous language of New Zealand), and planned to live locally for the next 2 years. Exclusion criteria applied after birth were prematurity (birth before 37 weeks' gestation;  $n = 18$ ) or identification of a congenital abnormality or disability likely to affect feeding or growth ( $n = 8$ ). Eligible volunteers ( $n = 206$ ) were randomly assigned to control or BLISS groups with random length blocks, after stratification for parity (first, subsequent child) and education (tertiary degree or diploma: yes, no). All outcome data were collected by research staff blinded to group allocation.

All families received free well child health care, available to all New Zealand children from birth to 5 years of age, which typically involves 8 visits before 12 months of age and endorses conventional complementary feeding methods.<sup>1,15</sup> Participants in the BLISS group received 8 additional group or individual parent contacts (delivered face to face or by telephone) for education and support regarding the BLISS approach to complementary feeding (5 contacts with an international board certified lactation consultant from antenatal to 5 months, and 3 home visits from a research assistant trained in the BLISS approach at 5.5, 7, and 9 months of age). Additional support

was available when requested. Parents were strongly encouraged to delay the introduction of complementary foods to 6 months<sup>16,17</sup> (so that infants were able to sit upright and feed themselves safely when they started solids) and to allow the infant to feed themselves all their complementary foods from 6 months. Intervention messages about minimizing the risk of food-related choking (Fig 1) were developed with a pediatric speech-language therapist and discussed in detail at the 5.5-month postpartum home visit. A booklet, *Safety When Starting Food*, that was discussed at this visit included information on how to recognize and manage choking and gagging (Supplemental Information), and how to provide cardiopulmonary resuscitation if necessary (developed in consultation with the Order of St John: <http://www.stjohn.org.nz/>).

## Outcome Measurements

### Questionnaires

Demographic variables collected at baseline (third trimester) included maternal self-reported prepregnancy weight and height, parity, education, age at child's birth, ethnicity, and household deprivation.<sup>18</sup> Infant sex and birth weight were obtained from hospital records. Age when complementary foods were introduced was determined at 2, 4, 6, 7, 8, 9, and 12 months of age. Choking (a piece of food partially or completely blocking the airway, affecting breathing) and gagging (a reflex closing off the throat and pushing the tongue to the front of the mouth) were assessed by questionnaire when infants were 6, 7, 8, 9, and 12 months of age (primary outcome). These questions assessed the frequency of choking and gagging over the past month (or since birth for the 6-month questionnaire). Parents of children who had experienced food-related choking in the past month were asked additional questions about

the event they thought was the most serious: symptoms, who resolved the choking, the food, what form it was fed in, and who fed the child. Parental supervision of infant eating was assessed in the 7-, 8-, 9-, and 12-month questionnaires. Adherence to the BLISS intervention was defined as infants feeding themselves most or all of their food in the previous week in the 7-month questionnaire.

### Calendars

To minimize recall bias, parents completed two 4-week calendars when their infant was 6 and 8 months of age, indicating each day whether the infant had gagged or choked (providing “yes” or “no” responses to differentiate between absence of an event and missing data).

### Weighed Diet Records

Parents completed weighed diet records on 3 randomly assigned, nonconsecutive days (2 weekdays, 1 weekend day) over 3 weeks when the infants were 7 and 12 months of age.<sup>13</sup> Information was obtained on the form of each item consumed (liquid, puréed, mashed, diced [chopped into small pieces, needing a spoon to eat], sliced, and whole [in its original shape, or cut into more manageable pieces, eg, toast fingers]) and on who fed the food to the infant. We developed a list of foods to assess infant exposure to foods that posed a choking risk (Supplemental Table 4). The list was based on our pilot study<sup>14</sup> and updated according to recent New Zealand Ministry of Health<sup>18</sup> and American Academy of Pediatrics guidelines.<sup>19,20</sup> A pediatric speech–language therapist made additional modifications.

### Statistical Analysis

Statistical analyses were undertaken with Stata 13 (Stata Corp, College Station, TX). Throughout, months refer to whole months unless stated otherwise, so that “8 months” refers to 8.0 to 8.9 months of age. The BLISS study was powered to detect

### General principles

1. Test foods before they are offered to ensure they are soft enough to mash with the tongue on the roof of the mouth (or are large and fibrous enough that small pieces do not break off when sucked and chewed, eg, strips of meat) especially in the early months.
2. Avoid offering foods that form a crumb in the mouth.
3. Make sure that the foods offered are at least as long as the child’s fist, on at least one side of the food.
4. Make sure the infant is always sitting upright when he or she is eating, never leaning backwards.
5. Never leave your baby alone with food; always have an adult with the child when he or she is eating.
6. Never let anyone except your baby put food into her mouth; the infant must eat at her own pace and under her own control.

### Foods to avoid when introducing solids to your baby

1. Foods that you can’t mash on the roof of your mouth with your tongue
2. Very small foods such as nuts, grapes, sweets, and fruit with stones (unless you’ve removed the stones)
3. Raw vegetables
4. Raw apple (whole or sliced)
5. Underripe or hard fruit
6. Citrus fruits (oranges, mandarins) unless each segment has been peeled
7. Whole nuts (peanut butter and other nut butters are fine)
8. Popcorn
9. Sausages, carrots, or any other similar food cut into rounds or “coins”

### FIGURE 1

Intervention messages to minimize the risk of choking.

differences in the primary outcome (infant BMI) rather than choking, a secondary outcome.<sup>13</sup>

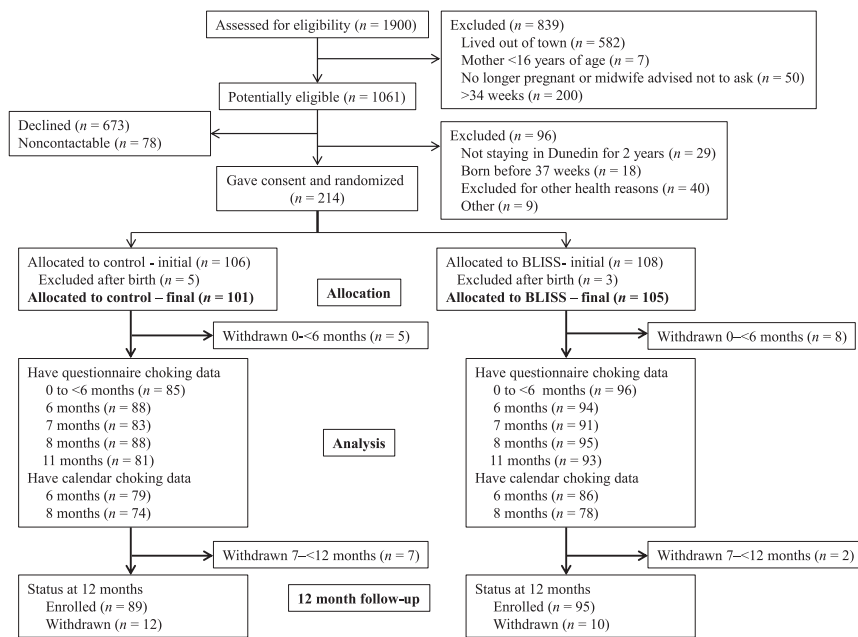
The data were analyzed according to modified intention to treat. Poisson regression with robust SEs compared the number of children who choked and gagged, and the number of children offered foods posing a choking risk, in the BLISS and control groups.<sup>21</sup> Negative binomial regression compared the number of gagging events per infant in the 2 groups (by using relative risks [RRs] with 95% CIs).

The 129 parent-defined most serious choking episodes are described in detail in the supplemental tables. Infants were also divided into 4 groups according to adherence to a baby-led approach to infant feeding: not baby-led (always or mostly fed by an adult), partially baby-led (approximately half fed by an adult and half self-fed), baby-led (always or mostly self-fed), and not yet started solids. Because the numbers were small, no statistical tests were carried out on these sets of data.

### RESULTS

Between December 2012 and March 2014, 206 eligible families agreed to participate (23% response rate; Fig 2). Retention was high, with 184 families (89%) remaining at 12 months. Mothers were predominantly European (82%) and well educated, and fewer had high levels of household deprivation (21%) than is observed nationally (30%)<sup>22</sup> (Table 1). At 7 months of age, 73% of BLISS infants had followed a baby-led approach to infant feeding for the past week (ie, adherent to BLISS), compared with 19% of controls. Significantly more BLISS (65%) than control (18%) infants waited until 6 months of age before starting solids ( $P < .01$ ).

The number of children who choked did not differ significantly between the groups at any age (Table 2). Complete questionnaire data were provided for 170 infants at 6, 7, and 8 months of age, 59 of whom choked at least once (35%). Most of the infants who choked in any given month (68% at 8 months to



**FIGURE 2**  
Participant flow through the study.

77% at 7 months) only did so once or twice that month, although 1 BLISS participant choked 8 times at 6 months (choking only once more in the next 3 months).

In total, 8114 gagging episodes were reported (from birth to 8 months and at 11 months of age). Significantly more BLISS infants gagged at least once at 6 months (questionnaire and calendar; Table 2), and BLISS infants also gagged more frequently at 6 months of age, compared with controls (RR 1.56; 95% CI, 1.13–2.17; Table 3). However, BLISS infants gagged less frequently than control infants at 8 months (RR 0.60; 95% CI, 0.42–0.87).

At 7 months of age, 85 (52%) infants were offered a food posing a choking risk at least once during the 3-day weighed diet record (Supplemental Table 5), rising to 136 infants (94%) by 12 months (Supplemental Table 6). No significant group differences were observed at either age in the total number of choking risk foods offered (7 months: RR 1.12; 95% CI, 0.79–1.59; 12 months: RR 0.94; 95% CI, 0.83–1.07). The most commonly offered foods posing a choking risk

are listed in Supplemental Tables 5 and 6. At 7 months of age, this was teething rusks for both groups (14% to 19%), followed by hard crackers (13%, BLISS) and raw vegetables (13%, controls). At 12 months, hard crackers were the most commonly offered food posing a choking risk (47% and 48%).

In total, 199 choking events were reported in 894 questionnaires (from birth to 8 months and at 11 months of age). Parents were asked to describe their infant’s “most serious” choking episode in the last month, providing detailed data on 129 of these 199 events (Supplemental Table 7). In many cases, only 1 event had occurred in a given month and was described as the most serious by default. Across both groups, the infant had fed themselves on 109 (84%) occasions, and food of “whole” consistency was involved on 75 (58%) occasions. The infant resolved the choking episode without assistance 51% of the time (Supplemental Table 7). A health professional became involved or the infant was admitted to hospital on only 3 occasions (2 BLISS, 1 control;

2 involving milk, 1 involving a food placed in the child’s mouth by a parent). Of the foods responsible for the parent-defined most serious choking events (Supplemental Table 8), only 23% were from our list of foods considered to pose a choking risk.

Because infants feeding themselves whole foods is the hallmark of a baby-led approach, and we did not achieve complete adherence in either the BLISS or control groups, we investigated whether the degree of adherence to a baby-led approach influenced choking risk. Supplemental Table 9 indicates that the proportion of infants who choked appeared broadly similar across the adherence categories at each age.

From 6 to 8 months of age, 71% (8 months) to 79% (6 months) of infants always had a parent or other adult sitting with them while they were eating, which did not differ between groups. However, at 11 months of age infants in the BLISS group were twice as likely as control infants to have a parent or other adult sitting with them (65% vs 44%; RR 1.97; 95% CI, 1.09–3.56).

## DISCUSSION

The BLISS approach to complementary feeding, which included specific advice to minimize the risk of food-related choking, did not appear to result in more choking events in the first year of life than were observed in the control group. However, half of all infants were offered  $\geq 1$  food posing a choking risk during 3 days of diet recording at 7 months of age, which increased to nearly all infants at 12 months. Of the 129 parent-defined most serious choking episodes reported, only 23% of the foods involved were items from a list of foods considered to pose a choking risk. The majority of events occurred when the infants were feeding themselves whole foods, regardless of study group.

Gagging was reasonably common, with BLISS infants gagging more often than control infants at 6 months of age but less often at 8 months of age, presumably as they became more experienced at feeding themselves.

It is difficult to compare our findings because there have been so few studies. It is also important to note that our intervention used a modified version of BLW. The modified version strongly encouraged delaying complementary feeding until 6 months of age and provided written and verbal messages specifically designed to reduce food-related choking. Our observation that BLISS did not increase the risk of choking relative to more traditional feeding methods should not be extrapolated to unmodified versions of BLW. The only existing data on choking in BLW come from our BLISS research group, a small survey reporting similar “ever” choking rates of 31% to 40% in BLW infants and 31% in conventionally fed infants.<sup>12</sup>

There are a number of possible explanations for infants so frequently being offered foods that pose a choking risk. Parents receive a wealth of information in the first year of their child’s life,<sup>15</sup> and it is possible that messages about food-related choking are overshadowed by other topics such as breastfeeding and safe sleeping practices or that the information is not easily applied. Advice on modifying foods that pose a choking risk may be beneficial, especially where healthful foods (eg, raw vegetables) are involved, because parents may not want to limit these foods in their infant’s diet or in shared meals. Advice to avoid raw apple may be particularly important because previous BLW research indicated it was the food most commonly associated with choking.<sup>8</sup> Our diet record data are reassuring in that this advice was generally adhered to in BLISS, with only 1 infant offered raw apple at

**TABLE 1** Baseline Characteristics of Mothers, Infants, and Households in the Control and BLISS Groups

Variable	Control (n = 101)	BLISS (n = 105)
Maternal age, y, <sup>a</sup> mean (SD)	31.3 (6.2)	31.3 (5.0)
Prepregnancy BMI, <sup>b</sup> mean (SD)	25.6 (6.2)	25.9 (6.3)
Maternal education		
School only	29 (28.7)	34 (32.4)
Postsecondary	19 (18.8)	24 (22.9)
University degree or diploma	53 (52.5)	47 (44.8)
Maternal employment		
Not employed	33 (32.7)	20 (19.0)
Part time	27 (26.7)	36 (34.3)
Full time	41 (40.6)	49 (46.7)
Parity		
First child	42 (41.6)	43 (41.0)
2 children	32 (31.7)	43 (41.0)
≥3 children	27 (26.7)	19 (18.0)
Marital status		
Single	9 (8.9)	8 (7.6)
Married or with partner	92 (91.1)	97 (92.4)
Maternal ethnicity		
New Zealand European and other	85 (84.2)	83 (79.0)
Māori or Pacific	10 (9.9)	15 (14.1)
Asian	6 (5.9)	7 (6.7)
Household deprivation <sup>c</sup>		
1–3 (low)	29 (28.7)	31 (29.5)
4–7	49 (48.5)	53 (50.5)
8–10 (high)	23 (22.8)	21 (20.0)
Infant birth wt, g, <sup>d</sup> mean (SD)	3534 (490)	3517 (439)
Infant sex <sup>e</sup>		
Male	53 (52.5)	43 (41.0)
Female	47 (47.5)	62 (59.0)

Data expressed as n (%) except where indicated.

<sup>a</sup> Data missing for 1 participant.

<sup>b</sup> Data missing for 7 participants.

<sup>c</sup> NZDep13 is the New Zealand Deprivation Score, a measure of household deprivation that ranges from 1 (least deprived) to 10 (most deprived).<sup>22</sup>

<sup>d</sup> Data missing for 9 participants.

<sup>e</sup> Data missing for 1 participant.

7 months of age, compared with 11 control infants.

Our finding that only 23% of the foods responsible for the 129 food-related choking episodes described by parents were items from our list of foods posing a choking risk may lead to questions about the comprehensiveness of the list. However, it was based on material from a range of literature, with additional development by experienced pediatric speech–language therapists. Rather, our findings indicate that infants can choke on a wide variety of foods and liquids, so it will not be possible to prevent all food-related choking, regardless of feeding method. Our results also suggest that the severity,

and therefore clinical importance, of the choking events reported varied. For example, it is likely that the 51 episodes resolved by the infant alone have limited clinical importance compared with the 3 choking episodes where health professionals became involved. Two of these 3 events were unrelated to the intervention because they were hospital admissions resulting from choking on milk rather than solid foods. The third event involved a BLISS parent placing a piece of food directly in the infant’s mouth, which contradicted BLISS guidelines (Fig 1). It is therefore important that parents who follow baby-led approaches are given, understand, and implement safety advice (eg, Fig 1).

**TABLE 2** Number of Infants Choking or Gagging Each Month According to the Questionnaire and Calendar

Age <sup>a</sup>	Control	BLISS	RR (95% CI) <sup>b</sup>	<i>P</i> <sup>c</sup>
Choked at least once, by questionnaire <sup>d</sup>				
0 to <6 mo	6/85 (7.1)	8/96 (8.3)	1.10 (0.39–3.10)	.86
6 mo	19/88 (21.6)	17/94 (18.1)	0.86 (0.48–1.54)	.61
7 mo	7/83 (8.4)	11/91 (12.1)	1.31 (0.53–3.21)	.56
8 mo	16/88 (18.2)	14/95 (14.7)	0.78 (0.40–1.52)	.46
11 mo	13/81 (16.0)	18/93 (19.4)	1.21 (0.63–2.31)	.57
Choked at least once, by calendar				
6 mo	20/79 (25.3)	14/86 (16.3)	0.67 (0.37–1.23)	.20
8 mo	14/74 (18.9)	14/78 (17.9)	0.94 (0.48–1.87)	.87
Gagged at least once, by questionnaire <sup>d</sup>				
0 to <6 mo	51/85 (60.0)	57/96 (59.4)	0.99 (0.78–1.26)	.93
6 mo	71/88 (80.7)	89/94 (94.7)	1.17 (1.05–1.31)	<.01
7 mo	63/83 (75.9)	71/91 (78.0)	1.03 (0.87–1.21)	.72
8 mo	72/88 (81.8)	78/95 (82.1)	1.01 (0.88–1.16)	.86
11 mo	38/81 (46.9)	42/93 (45.2)	1.04 (0.79–1.37)	.78
Gagged at least once, by calendar				
6 mo	66/79 (83.5)	80/85 (94.1)	1.13 (1.01–1.26)	.03
8 mo	66/73 (90.4)	67/79 (84.8)	0.94 (0.84–1.06)	.34

Data expressed as number of participants who choked or gagged/number of participants with data (%).

<sup>a</sup> Months refer to whole months, unless stated otherwise, so that “8 mo” refers to 8.0–8.9 mo of age.

<sup>b</sup> RR in BLISS participants compared with control participants. Data were analyzed via Poisson regression with robust SEs, controlling for maternal education and parity (the stratification variables used at randomization).

<sup>c</sup> *P* value is for RR in BLISS participants compared with control participants, controlling for maternal education and parity (the stratification variables used at randomization).

<sup>d</sup> Questionnaire data were collected retrospectively at the beginning of the next month. For example, the data reported here for age 6 mo were collected in the 7-mo questionnaire.

**TABLE 3** Mean Number of Gagging Events per Infant, per Month, According to the Questionnaire

Age, mo <sup>a</sup>	Control <sup>b</sup>	Minimum, Maximum	BLISS <sup>b</sup>	Minimum, Maximum	RR (95% CI) <sup>c</sup>	<i>P</i> <sup>d</sup>
0 to <6 <sup>e</sup>	7.8 (15.0)	0, 90	14.0 (35.1)	0, 270	1.81 (0.97–3.38)	.06
6	9.4 (11.3)	0, 60	14.7 (16.7)	0, 105	1.56 (1.13–2.17)	<.01
7	7.5 (12.5)	0, 90	7.9 (10.3)	0, 60	1.05 (0.69–1.61)	.81
8	9.4 (15.1)	0, 90	5.6 (5.6)	0, 30	0.60 (0.42–0.87)	<.01
11	7.5 (17.2)	0, 90	5.8 (11.5)	0, 60	0.79 (0.42–1.48)	.46

Data presented as mean (SD).

<sup>a</sup> Months refer to whole months, unless stated otherwise, so that “8 mo” refers to 8.0–8.9 mo of age.

<sup>b</sup> Refer to Table 2 for the number of participants with data in each group, at each age.

<sup>c</sup> Data were analyzed via negative binomial regression. Results are presented as RR of gagging in BLISS participants compared with control participants, controlling for maternal education and parity (stratification variables used at randomization).

<sup>d</sup> *P* value compares the mean number of gagging events per month among BLISS participants with the mean number among control participants, controlling for maternal education and parity (stratification variables used at randomization).

<sup>e</sup> Questionnaire data were collected retrospectively at the beginning of the next month. For example, the data reported here for age 6 mo were collected in the 7-mo questionnaire.

Furthermore, close supervision of all infant eating occasions (regardless of the method of infant feeding) is of paramount importance so that any unavoidable episodes of choking can be identified and managed promptly.<sup>1,23,24</sup> The majority of choking episodes occurred during infant self-feeding of whole foods, although there was no evidence that following a baby-led approach increased the risk of choking itself. However, it is important to

remember that the majority of infants who adhered to a baby-led approach were in the BLISS group and so had received specific advice to decrease their risk of choking.

The BLISS study is the first randomized controlled trial to investigate the safety of a baby-led approach to infant feeding. Strengths include the use of multiple methods of measurement and repeated careful assessment. However, there

were also some limitations. It is possible that some misclassifications of choking episodes occurred because they were parent-defined. However, considerable efforts were made to ensure that parents clearly understood the differences between gagging and choking, and 117 (92%) of the 127 episodes of choking directly observed by a parent included  $\geq 1$  indication of airway compromise (“coughed,” “gagged,” or “went silent”), suggesting that overall misclassification was low. Although recall bias was possible in the retrospective questionnaires, comparable data were collected from the daily calendars, suggesting that recall of choking and gagging was accurate (Table 2). Because the study was powered to detect differences in infant BMI rather than choking, we had insufficient power to determine whether the rates of the most clinically significant choking events (necessitating medical intervention) differed by group. We also recognize that the response rate to the study was low (23% of eligible Dunedin births), and the sample was socioeconomically advantaged, which may limit extrapolation to other populations.

## CONCLUSIONS

Infants following a version of BLW modified to address concerns about choking did not appear to choke more often than other infants, suggesting that baby-led approaches to complementary feeding can be as safe as traditional spoon-feeding methods. However, high proportions of infants in both groups were offered foods posing a choking risk, infants were not consistently closely supervised while eating, and a small number of serious choking events were observed in both study groups. Although it would be wise to include the advice tested in the BLISS study in any specific advisories for parents following baby-led approaches, it

is also clear that regardless of the method of complementary feeding, more work is needed to ensure that parents and caregivers know how to provide safe foods and feeding environments, and it is essential that parents are taught how to deal with unavoidable choking episodes.

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## ABBREVIATIONS

BLISS: Baby-Led Introduction to Solids  
BLW: baby-led weaning  
CI: confidence interval  
RR: relative risk

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