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REPORT OF THE 1998 RAROTONGA INFANT FEEDING SURVEY

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SUMMARY

Little is documented on infant feeding practices in the Cook Islands. One previous survey conducted in 1989 indicated that the average duration of exclusive breast-feeding was less than one month. The very early introduction of complementary drinks and foods seemed to be common practice. Additionally, questions have been raised about the associations between infant feeding practice and the high rates of adult overweight experienced in the Cook Islands. In 1992, Public Health Department policy was to follow the 1989 WHO/UNICEF initiative on promoting exclusive breast-feeding for infants for the first four to six months of life. This was supported by the provision of infant feeding information materials, education, support and advice for Public Health Nurses (PHN) and women of childbearing age.

This report describes a survey undertaken to provide baseline information on infant feeding practices, evaluate the effectiveness of the 1992 policy and programme and act as a foundation for future policies and programmes. Data were collected and analysed from 222 women with infants less than 24 months of age, attending the 32 Community Health Clinics (CHC) in Rarotonga, via face-to-face interviews and group discussions. A parallel project was simultaneously carried out assessing the growth of Rarotongan infants less than 24 months of age.

Results include the following. Nearly 57% of all mothers in the study were currently breast-feeding their infants. Amongst those with infants less than four months old, 90.6% were breast-feeding. However, amongst mothers with infants less than one month of age, only 36% were exclusively breast-feeding and of the mothers with infants between one and four months old, 14.3% were exclusively breast-feeding. The median duration of breast-feeding in the survey sample was seven to eight months. In other words, half of the mothers in the study stopped breastfeeding entirely before the end of the eighth month of life of their infant. Nearly 59% of mothers recalled initiating breast-feeding within one hour after birth. Of those with infants less than 4 months of age, 45.0% were exclusively breast-feeding; compared with only 4.3% of mothers who initiated breast-feeding more than one hour after birth. Over 20% of mothers had some problems breast-feeding. Of these, nearly 60% of these had milk-supply and breast problems. Over half of the mothers introduced drinks to their infants before one month of age and 41% of mothers introduced foods to their infant before four months. By far the most common first drink given to infants was *nu* (coconut water), followed by water and juice. The most common foods given were commercial baby foods, cereals, rice and fruits. The most common reason for the early introduction of drinks and food was insufficient breast-milk supply. There was a significant increase in the number of mothers who breast-fed their infants between 1992 and 1998. The greatest influences on mother's breast-feeding practice were family members, mother's knowledge and confidence about breast-milk supply, traditions and work commitments.

It was concluded that compliance with UNICEF/WHO breast-feeding recommendations was low and many infants were introduced to complementary drinks and foods far too early in life. The large proportion (90.6%) of mothers breast-feeding their infants up to four months of age suggest that the majority already know that breast is best. It is common practice to feed very young infants (on the first day

of life) with *nu*. This should be discouraged, especially in hospitals and CHCs. Breast-milk is the only food that provides for an infant's needs for the first four to six months of life.

Mothers who breast-fed their infants within one hour of birth were found to be ten times more likely to exclusively breast-feed their infants for up to four months of age. This result emphasises the importance of providing breast-feeding support for mothers directly after birth. Knowledge alone of the importance of breast-feeding might not overcome these barriers.

Recommendations include the following.

- The Public Health Department continues to support the UNICEF/WHO recommendations on breast-feeding practice, especially exclusive breast-feeding.
- Due to the early introduction of complementary drinks and foods, the Cook Islands breast-feeding programme focuses more on ensuring that barriers to exclusively breast-feeding babies up to six months of age and continuing breast-feeding up to two years and beyond are addressed.
- Clear guidelines are developed for both PHNs and mothers explaining clearly that the premature administration of drinks and foods, is not the best for infants. The benefits of feeding infants breast-milk as opposed to *nu* should be clearly explained. The best advice on breast-feeding can be given by the Public Health Department and hospital maternity nurses.
- The Cook Islands Hospital Services intensify current support of mothers at the time of the birth of their infants. This support should be in terms of readily available expertise on breast-feeding and positioning that provides for the psychological and emotional needs of mothers at the time of the birth of their infants.
- The Cook Islands Public Health Department intensifies current support of mothers at the first postnatal home visit, within the first week of the infant's life. This support should be in terms of readily available expertise on breast-feeding that provides for the psychological and emotional needs of mothers within the first few weeks of their infants' life.
- Regular assessment of services is conducted of both the Cook Islands Hospital and Public Health Department to evaluate compliance to the infant feeding policy of the Ministry of Health (MOH).
- A follow-up experimental study of a cohort of Cook Island infants needs to be undertaken to determine whether the early introduction of drinks and foods contributes to overweight in infancy, childhood and/or adulthood.

INTRODUCTION

Little is documented on the feeding practices of infants in the Cook Islands. Only one survey has been undertaken in the recent years that provided limited information (1). Since 1992, exclusive breast-feeding of infants has been recommended by the Public Health Division of the Cook Islands Government. Anecdotal evidence at that time and a review of previous studies done in 1964, 1975 and 1980, suggest that the proportion of infants breast-fed and the level of exclusive breast-feeding before 1992 was declining (2). However, the effect of the implementation of the policy since 1992 is not known.

It is known that adult Cook Islanders, especially women, suffer high rates of overweight and obesity (3-5). It is also known that on average, weight or weight for height of Cook Islands pre-school and school-aged children is higher than that of reference populations (1,2,6-8). Questions about why and how this has occurred have been asked for many years. Infant feeding practice may contribute to this as formula-fed infants have been shown to increase weight at a greater rate than breast-fed infants from the 3rd to 12th months of life (9). If this is so, it is likely that the early introduction of fluids and foods to infants may also contribute to higher rates of overweight and obesity.

The 1989 Cook Islands Nutritional Assessment Survey

A nutritional assessment survey was undertaken in 1989 to provide a basis for a National Food and Nutrition Policy. Results showed that infants from the southern group of the Cook Islands were exclusively breast-fed, on average, for one month or less, although breast-feeding in addition to other drinks and foods continued for up to four years (1). However, a large proportion of respondents (65%) with infants less than one year old did not provide information on duration of breast-feeding. With such a large proportion not responding, the reliability of the results is questionable.

In Rarotonga, of the 80 children less than one year old included in the survey, 12.5% were exclusively breast-fed; 56.3% were breast and bottle fed (with or without complementary food); and 25.0% were bottle-fed (with or without complementary foods).

Results of data on age of introduction of fluids and solid foods to infants were less clear due to the large proportion (over 60%) not responding to the survey questions. Of those who answered the survey questions, over 70% introduced solid foods to their infants before they were 4 months old (18.2% at 1 month, 29.5% at 2 months and 25.0% at 3 months). Fluids were introduced at a much earlier age with 87.0% of respondents giving drinks to their infants at 1 month of age or less (61.4% at 0-1 weeks, 12.8% at 2 to 3 weeks and 12.8% at 4 weeks). The most common fluids introduced to infants were *nu* (coconut drink) (35.7%), pawpaw juice (33.3%) and water (10.7%). Most common foods were pawpaw (28.1%), pumpkin (11.5%) and cereals (16.6%).

Newborn infants were often given *nu* before one week of age in the hospitals when mothers breast-milk supply had not come in. Previously, processed glucose drink was given (1).

Background to the present survey

The 1989 survey was the most recent study that attempted to describe infant feeding practices in the Cook Islands. The amount of breast-feeding information it provided was limited and seemed to raise more questions than it answered. Additionally, it is suspected that the early introduction of complementary fluids and foods to infants has continued.

In 1989, WHO and UNICEF issued a joint statement addressed to health and nutrition policymakers and workers on protecting, promoting and supporting breast-feeding (10). One of the key messages of the joint statement is the importance of providing support to all mothers to exclusively breast-feed for the first 4 to 6 months of life. In 1992, the policy of the Cook Islands Public Health Department was to follow the WHO/UNICEF initiative on promoting exclusive breast-feeding for infants up to 4 to 6 months of age (11). This was supported by a programme that included the provision of infant feeding information materials, training, education, support and advice for Public Health Nurses and women of childbearing age. It is the role of the Public Health Nutritionist to promote the policy and to provide support to mothers in the Cook Islands. Since 1992, no evaluation has been undertaken to determine the effectiveness of the policy or the programme.

Overweight and obesity

The level of adult overweight and obesity in the Cook Islands is high, as it is in other Polynesian countries. Overweight and obesity have been shown to contribute to increases in heart disease, diabetes, hypertension, gout and musculo-skeletal problems (12). These diseases also have a high prevalence and incidence in Rarotonga. A baseline survey on non-communicable diseases (NCD) was undertaken in September 1980 amongst 1,127 adults living in the urban area of Avarua on the main island of Rarotonga by the Cook Islands Government and the Secretariat of the Pacific Community (SPC, formerly South Pacific Commission) (4). The survey showed that obesity and high blood pressure were extremely common amongst adults aged 20 years and older. Nearly one-quarter of the sample had hypertension and nearly one half of the women were obese (>140% of ideal weight). In addition, over 5 per cent of men and 8 per cent of women had diabetes.

In 1987 a follow-up survey was undertaken. It showed that over 20 per cent of the men and over half the women surveyed were defined as obese. In this survey the overall age-adjusted means in Body Mass Index were significantly higher than in 1980 for both men ($p<0.01$) and women ($p<0.001$) and showed that the weight of Cook Island adults was increasing. Among the cohort members, 22% men and 38% women had become obese since the 1980 survey. The majority were aged between 35 to 54 and had been overweight in 1980 (5).

Rationale

With the above in mind, a survey was undertaken to provide baseline information on the infant feeding practices of Rarotongan mothers as a foundation for future development of appropriate policies and programmes.

Simultaneously, a parallel survey assessing the growth of Rarotongan infants was undertaken to assess the growth of infants born between 01 January 1995 and 30 April 1998 from data collected on the record cards kept at Community Health Clinics

(CHC) in Rarotonga. The aim of the project was to describe the pattern of growth of infants less than 24 months of age from records obtained from 32 CHCs. The results of this project are reported elsewhere (8).

Secondly, information collected in the present survey would also provide a means of evaluating the effects of the UNICEF/WHO exclusive breast-feeding initiative introduced to the Cook Islands in 1992. Additionally, the information might provide a better understanding of the aetiology of overweight and obesity in Rarotonga, especially in relation to the feeding patterns practised by mothers.

The aim and specific objectives of the survey are given below.

Aim

To describe the infant feeding practices of Rarotongan mothers with infants aged less than 24 months.

Objectives

1. Identify the proportion of Rarotongan mothers who:
   - exclusively breast-feed their infants
   - use formula foods
   - use complementary foods
   - utilise a combination of the above.
2. Investigate the duration of breast-feeding amongst Rarotongan mothers.
3. Investigate the age of infants at the introduction of complementary drinks and foods.

METHODOLOGY

The Rarotonga Infant Feeding Survey was carried out by staff from the Nutrition Section, Public Health Department of the Cook Islands Ministry of Health, namely: Ms Karen Tairea, the Public Health Nutritionist, Repaio Taia Puroko, the Health Education/Nutrition Assistant and Ms Tania Avare, Nutrition Assistant. They were assisted by Mr Robert Hughes, Nutritionist/Non-Communicable Disease Epidemiologist (SPC), Ms Maria Celia Hughes, SPC Consultant, three post-graduate nutrition students from the University of Wollongong, Australia, and the Public Health Nurses (PHN) who manage the 32 CHCs in Rarotonga. The survey was conducted between 20 April and 21 May1998.

Target population

The target population comprised mothers of infants less than 24 months of age attending CHCs in Rarotonga between 20 April and 21 May 1998.

Data collection

There were 368 mothers recorded on clinic record cards as having infants less than 24 months of age. There were 241 mothers regularly attending the clinics of which data were collected from 235. Of this number, 10 (4.3%) were either grandmothers of the infant or other relatives who cared for the infant full time.

Face-to-face interviews were conducted using a questionnaire. All mothers attending the clinics with infants aged less than 24 months of age were eligible to answer the questions. The questionnaire is shown in **Annex A**. All six survey team members were involved in the design of the questionnaire and of the methodology for data collection. Finalisation of the questionnaire and training of survey team members was done during the week before the survey. An interview guide **(Annex B)** was constructed to maintain consistency and to remind interviewers when and where to prompt for further information. A glossary of Maori terms for common foods and drinks and brand names of formula and cow's-milk available in Rarotonga was likewise provided **(Annex C)** to assist the non-Maori speakers in understanding answers to survey questions.

Clinic record cards were reviewed before clinic visits to identify all mothers attending (total population) and mothers eligible for the survey (survey population). CHC cards of all children less than 24 months old were separated from the rest to facilitate identification of eligible mothers. Assignment of individual mother's codes and actual conduct of the survey were done in conjunction with the Infant Growth Monitoring Project (8).

Members of the survey team visited each clinic on the scheduled CHC clinic days. During these days, mothers brought their infants for weighing, general health checks and immunisation. The clinic days generally ran from 0900 to 1100 one morning each week. Most mothers stayed around the clinics and socialised with others for this time. In some clinics, food and drink were brought to share amongst the mothers. Up to four clinics were surveyed simultaneously on any one morning. Individual mothers were interviewed after their baby was checked and weighed by the PHN. In some cases when infants were brought to the clinic by baby-sitters or relations, the mother was located and interviewed later at home or work.

At some clinics, survey team members generated general group discussions and were able to collect qualitative information about infant feeding practices and the factors that influence those practices. These group discussions were done without any structured questionnaire. Mothers, grandmothers, babysitters and PHNs gave their reasons and interpretations about various infant feeding issues. Other information on infant feeding practices were expressed by mothers during the face-to-face interviews. This information was recorded by survey team members and used to describe the social/cultural context of infant feeding and to explain and interpret some of the quantitative data gathered.

Data collected and variables measured

The survey questionnaire **(Annex A)** has three parts. The first part collects birthdate and birthweight of infants, as well as age and employment status of the mother. The second part contains a series of questions designed to obtain information on the current feeding practices of the mothers. The last part focuses on past feeding practices of the mothers, specifically on breast-feeding children born before 1992 (if any) and the penultimate child (child born before the current survey infant). The last part of the questionnaire also elicits data on the mother's source(s) of information on breast-feeding. **Table 1** lists the major variables measured in the survey.

Table 1. List of variables collected

Survey infants
Age (months)
Birthweight (grams)
Mothers
Age (years)
Employment status (yes/no, part/full-time)
Current feeding practices - survey infants
Proportion of
- exclusive breast-feeders
- predominant breast-feeders
- complementary feeders
- mixed feeders
- formula/cow's-milk feeders
- no-milk feeders
Median duration of breast-feeding
Continued breast-feeding rate (at 1 and 2 years)
No. of hours after birth breast-feeding was initiated
Problems encountered in breast-feeding
First food/drink other than milk introduced to infant
Age of infant upon introduction of first food/drink other than milk
Method of giving drink other than milk to infant
Reasons for giving food/drink other than milk
Breast-feeding practice (yes/no) - children born before 1992
Feeding practices - penultimate child
Breast-feeding practice (yes/no)
Age stopped breast-feeding
Problems encountered in breast-feeding
First food/drink other than milk introduced to infant
Age of infant upon introduction of first food/drink other than milk
Source of information on breast-feeding

Ages of the survey infants were expressed in months and were calculated using date of birth as reported by the mother and date of interview. Ages of introduction of food/drink to the survey infants and penultimate children of the mothers were originally recorded in weeks for greater accuracy. **Annex D** was used as a guide to convert weeks to months. Responses were checked against data recorded in clinic record cards. Birthweight of the survey infants was recorded as reported by the mothers.

Definitions listed below and the answers to five separate questions (questions 7, 8, 12, 13 and 14) of the questionnaire were used to group mothers according to the following feeding types:

- Exclusively breast-feeding (EBF)
- Predominantly breast-feeding (PBF)
- Complementary feeding (BFCF)
- Mixed feeding (MF)
- Formula/cow's-milk feeding (FF)
- No-milk feeding (NM)

Information on whether or not mothers breast-fed their children (if any) born before 1992 was elicited to determine whether a change in breast-feeding practices had occurred after 1992 at which time a campaign to promote exclusive breast-feeding for infants up to 4 months of age was started. In addition, to identify recent changes (if any) on infant feeding practices, the feeding practices of mothers for their penultimate child (the child born before the survey infant) were also obtained.

Definitions

- Breast-feeding: refers to feeding an infant, either directly from the breast or utilising expressed milk, for any length of time with or without any other foods or drinks.
- Exclusively breast-feeding: giving a baby no other food or drink, including water, in addition to breast-feeding (except medicines and vitamin or mineral drops; expressed breast-milk is also permitted) (13).
- Predominantly breast-feeding: breast-feeding a baby, but also giving small amounts of water or water-based drinks – such as tea (13). For this survey, this definition has been revised to include mothers who breast-feed their babies but also give water or other water-based drinks only. This was done since no information on amounts of drinks given to children was collected. Hence, the term "small amounts" could not be determined or defined for the present survey.
- Complementary feeding: giving a baby other food in addition to breast-feeding (13).
- Mixed feeding: breast-feeding a baby and also giving formula/cow's-milk, with or without other foods or drinks.
- Formula/cow's-milk feeding: when baby is not breast-fed at all but fed with formula or cow's-milk, with or without other foods or drinks.
- No-milk feeding: when baby is not given any kind of milk, whether breast-milk, formula or cow's-milk.
- Median duration of breast-feeding: the age (in months) when 50% of children are no longer breast-fed (14).
- Continued breast-feeding rate (1 year): proportion of children 12 to 15 months of age who are breast-feeding (14).
- Continued breast-feeding rate (2 years): proportion of children 20 to 23 months of age who are breast-feeding (14).
- Working: refers to paid employment, whether full or part time.

Data entry and editing

Individual questionnaires were brought back to the central office, edited and coded following the coding manual prepared for the survey **(Annex E)**. Survey team meetings were held after each clinic visit to discuss editing issues and relay qualitative information. Data were entered using EPI INFO v. 6 software (15).

Since most of the variables collected were in discrete number codes, frequency checks were done to ensure that only valid codes were entered. Logic checks, wherein answers to one question were used to counter-check information in another question, were also employed. Where necessary, the original questionnaire was consulted to make corrections.

Of the 235 women interviewed in the survey, 13 were not included in the analysis because their children were 24 months of age or older at the time of the interview. Thus, records for 213 mothers and nine grandmothers/carers, or a total of 222 records, were included in the analysis. Because of the close relationship between the infants' mothers and grandmothers or carers, some grandmothers and carers were able to answer some questions about the mother. For simplification, respondents of the survey are collectively called "mothers" in this report.

Data analysis

Frequency and percentage distributions were used to summarise categorical variables in the data set. Means and standard deviations were obtained for age of infants and mothers. Median duration of breast-feeding and continued breast-feeding rates at one and two years of age were calculated using procedures described by WHO (14). Tests used to determine the association between type of infant feeding practice and age of infant or mother; employment status of mother and experience of breast-feeding problems, included Student's t-test, Chi-square test, and ANOVA or Kruskal-Wallis test. ANOVA was used to test difference in means with homogeneous variances. For means with significantly different variances, the Kruskal-Wallis test was used. The t-test for matched samples was used to determine if there was a change in the reported age in introduction of foods or drinks to the penultimate and the survey child.

McNemar's Chi-squares were calculated to determine whether the proportion of mothers breast-feeding children born before 1992 or the penultimate children were significantly different from the proportion of mothers breast-feeding survey infants. Odds ratios were calculated to determine whether experience of breast-feeding problems in previous children was associated with breast-feeding practice and experience of breast-feeding problems with the survey infant.

Analyses were done using EPI INFO v. 6 software (15).

RESULTS

Description of the sample

Age of mothers ranged from 18 to 43 years, for a mean of 34.1 (sd=5.8) years. More than half (56.4%) of the mothers were in the 20 to 29 age group and about a third

(35.9%) were in the 30 to 39 age group. A total of 119 mothers (55.9%) indicated that they were working. Of which, 96 (80.7%) were full-time workers.
The mean age of infants was 10.0 months (sd=7.0). Birthweights ranged from 1,900 to 5,400 grams, with a mean of 3,442.9 grams (sd=575.6). The proportion of low birthweights (less than 2,500 grams) was 4.6% while 13.4% had weights greater than 4,000 grams.

Current breast-feeding practice

The majority of the 222 respondent mothers (56.8%, n=126) were currently breast-feeding the survey infants (with or without food/drink). Of the 96 who said they were currently not breast-feeding, half reported that they were giving infant formula, more than a third were giving Anchor® milk (reconstituted cow's milk) and 3.1% were giving other types of milk **(Table 2)**. Four mothers were not giving any milk alternatives to their infants. These infants were aged 17, 19, 21 and 23 months.

Table 2. Breast-milk alternatives being given to infants by non-breast-feeding mothers

Type of breast-milk alternative	N	%
Formula	52	54.2
Anchor®	37	38.5
Others	3	3.1
No milk	4	4.2
Total	96	100.0

Breast-feeding at the time of the survey (with or without food/drink) was associated with the age of the infant. The mean age of infants who were being breast-fed at the time of the survey was 7.5 months (sd=6.8) while the mean age of those not being breast-fed was 13.2 months (sd=5.8). **Table 3** shows the proportion of mothers currently breast-feeding (with or without food/drink) by age in months of their infants. The proportion of breast-feeders decreased as the age of infants increased. All mothers with infants less than 1 month were breast-feeding. This decreased to 46.2% of mothers with infants 6 months to less than 10 months old. On the other hand, the column on cumulative per cent on **Table 3** shows that amongst all mothers with infants less than 4 months old, 90.6% were breast-feeding. Grouping all mothers with infants less than 6 months, the proportion of breast-feeders decreased to 89.5%.

Of the 33 mothers with children aged 12 to less than 16 months, 36.4% reported they were still breast-feeding their infants (continued breast-feeding rate at 1 year). A similar proportion of mothers (37.0%) were breast-feeding their children 20 to less than 24 months old (continued breast-feeding rate at 2 years). Using procedures described by WHO (14), the median duration of breast-feeding in the survey sample was 7 to 8 months.

Majority of the mothers (58.9%) recalled initiating breast-feeding either immediately after birth to within one hour after, while 28.5% said breast-feeding was initiated two

to six hours after birth. Five mothers (2.4%) reported never breast-feeding their infant (Table 1F, Annex F).

Table 3. Proportion of mothers currently breast-feeding by age in months of infants

Age (months)	N	Breast-feeding	%	Cum %
< 1	11	11	100.0	100.0
1 - <4	42	37	88.1	90.6
4 - <6	23	20	87.0	89.5
6 - <10	39	18	46.2	74.8
10 - <12	19	7	36.8	69.4
12 - <16	33	12	36.4	62.9
16 - <20	28	11	39.3	59.5
20 - <24	27	10	37.0	56.8
Total	222	126	56.8	

note: breast-feeding: exclusive or with complementary food

Controlling for age of infant, mother's employment status was not significantly associated with breast-feeding practice (with or without food/drink) (χ^2=0.37, p=0.544) nor with whether she gave food or drink other than milk to her infant (χ^2=1.76, p=0.185). In other words, mothers breast-feed or give other foods and drinks to their infants regardless of whether they are working or not.

Types of infant feeding practices

Using answers to five questions in the survey and the definitions given in the Methodology section, the 126 mothers who were currently breast-feeding were re-classified into four categories: exclusively breast-feeding (EBF), predominantly breast-feeding (PBF), complementary feeders (BFCF), and mixed feeders (MF). The 96 mothers who were currently non breast-feeders were re-classified into formula/cow's-milk feeders (FF) and non-milk feeders (NM). These categories are given in **Table 4**.

Table 4. Distribution of mothers by infant feeding practice

Infant feeding practice	N	%
Exclusively breast-feeding (EBF)	15	6.8
Predominantly breast-feeding (PBF)	33	14.9
BF + Complementary feeding (BFCF)	70	31.5
Mixed feeding, w/ or w/o Complementary feeding (MF)	8	3.6
FF, w/ or w/o Complementary feeding (FF)	92	41.4
No milk (NM)	4	1.8
Total	222	100.0

Not considering age of the infants, the most common infant feeding practice of the survey mothers was formula/cow's-milk feeding (with or without food/drink), followed by breast-feeding plus complementary feeding (breast-feeding and food or food and drink).

Factors associated with type of feeding practice

To determine the relationship between infant feeding practice and age of infant and whether the mothers were following the general guidelines for infant feeding as outlined by WHO/UNICEF (10), the mothers were classified by infant feeding practice and age of infant.

Data in **Table 5** show that the type of feeding was significantly associated with the age of the infant (K-W=101.98, df=5, p<0.0001). Of the 11 mothers with infants aged less than 1 month, four (36.4%) were exclusively breast-feeding (EBF), six (54.5%) were also giving *nu* (PBF), and one (9.1%) was giving breast-milk, formula and *nu* (MF). Of the mothers with infants 1 to less than 4 months old, 14.3% were exclusively breast-feeding, 61.9% were giving other drinks aside from breast-milk, 9.5% were giving complementary food/drinks and 11.9% were giving formula. Grouping all mothers with infants less than 4 months old (n=53), 18.9% were exclusively breast-feeding and 60.4% were breast-feeding and giving other drinks; complementary feeding, mixed feeding and formula-feeding was used by 7.5%, 3.8% and 9.4% of mothers, respectively.

Table 5. Distribution of mothers by infant feeding practice and age of infants

Age (months)	N	Infant Feeding Practice (%)					
		EBF	PBF	BFCF	MF	FF	NM
< 1	11	36.4	54.5	0.0	9.1	0.0	0.0
1 - <4	42	14.3	61.9	9.5	2.4	11.9	0.0
4 - < 6	23	13.0	0.0	56.5	17.4	13.0	0.0
6 - <10	39	0.0	2.6	43.6	0.0	53.8	0.0
10 - <12	19	0.0	0.0	36.8	0.0	63.2	0.0
12 - <16	33	3.0	0.0	33.3	0.0	63.6	0.0
16 - <20	28	0.0	0.0	35.7	3.6	53.6	7.1
20 - <24	27	3.7	0.0	29.6	3.7	55.6	7.4
Total	222	6.8	14.9	31.5	3.6	41.4	1.8
Mean		3.9	1.6	11.0	7.9	12.9	20.0
sd		5.4	1.3	6.1	8.3	5.7	2.6
K-W, (df), p-value		101.98 (5) p<0.0001					

EBF - exclusively breast-feeding
PBF - predominantly breast-feeding
BFCF - complementary feeding
MF - mixed feeding (with or without food/drink)
FF - formula feeding (with or without food/drink)
NM - no-milk feeding

The feeding pattern for infants 4 to less than 6 months old was diverse: 56.5% were on complementary feeding while the remaining infants were either on exclusive breast-feeding, mixed, or formula/cow's-milk feeding. A crucial change in feeding practice was noted amongst mothers with infants 6 to less than 10 months. The proportion of mothers giving formula without any breast-milk to their infants jumped from 13.0% of mothers with infants 4 to less than 6 months to more than half (53.8%) of mothers with infants 6 months to less than 10 months. Thus, at this age group, less than half of the infants receive breast-milk. Complementary feeding and formula/cow's-milk feeding remained the main feeding practices employed by mothers for the older infants, with formula/cow's-milk feeding (without breast-milk) being employed by proportionately more mothers. Two mothers with infants aged 12 and 20 months, respectively, reported exclusively breast-feeding their infants.

To identify factors associated with infant feeding practice, statistical analyses were performed on a sub-sample of mothers with children 0 to less than 4 months of age, the recommended age range for exclusive breast-feeding. No significant association was found between infant feeding practice (re-classified into exclusive breast-feeding, predominant breast-feeding and others) and the following variables: age of mother ($F=0.065$, $df=2, 214$, $p=0.937$); work status of mother ($\chi^2=1.30$, $df=2$, $p=0.522$); and experience of problems in breast-feeding the survey infants ($\chi^2=2.35$, $df=2$, $p=0.309$). However, a significant association was found between infant feeding practice and number of hours after birth breast-feeding was initiated ($\chi^2=5.91$, $df=2$, $p=0.05$). Specifically, amongst mothers with infants less than 4 months who initiated breast-feeding immediately or within one hour after birth, 45.0% were exclusively breast-feeding; while amongst mothers who initiated breast-feeding more than one hour after birth, only 4.3% were practising exclusive breast-feeding.

Problems encountered in breast-feeding survey infants

All mothers, regardless of infant feeding practice, were asked if they were experiencing or had experienced problems breast-feeding the survey infants. Out of 215 mothers who answered this question, 44 (20.5%) said that they experienced or were experiencing problems in breast-feeding their infants. Problems are summarised in **Table 6.** Nipple and breast problems accounted for more than half (59.1%) of problems cited. These problems include cracked/sore nipples, "inverted" nipples, mastitis and breast engorgement.

Problems in breast-milk supply (31.8%) included one mother who said she had *"no milk"* and two others who said that their milk *"dried up"* after 1.5 and 3.5 months. Some mothers said their breast-milk took as much as three days to *"come in"*. Other mothers with supply problems just stated that they did not have enough breast-milk for their infants. In addition, six mothers (13.6%) said that their babies *"refused/rejected"* breast-milk or were *"reluctant to take the breast"*. One mother said her baby got used to the taste of formula milk, which was given to her baby while she was at work.

Age, employment status of the mother, age of the infant and time of initiation of breast-feeding were not significantly associated with experience of problems in breast-feeding ($p>0.05$).

Table 6. Reported problems in breast-feeding survey infants (n=44)

Problem	N	%
Nipple/breast problems	26	59.1
Milk supply/flow problems	14	31.8
Others	7	15.9

Note: Multiple response: percentages do not necessarily add up to 100

First drink introduced to survey infants

Excluding the 15 exclusively breast-feeding mothers and one mother giving breast-milk and formula only (with no other drink or food), a total of 206 mothers were currently giving other food or drink or both aside from milk (either breast-milk or formula/cow's-milk) to their infants. Of the 206, 163 (79.1%) were currently giving both food and drink, 39 (18.9%) drinks only and four (1.9%) food only.

The 206 mothers were further asked the age of their infants upon introduction of food or drink and the type that was first introduced to their infants.

Table 7 lists the first drinks introduced by 202 mothers (206 less 4 who gave food only). The most common first drink given to infants was *nu*, followed by water then juice. Of the 156 mothers who gave *nu*, 122 (78.2%) gave *nu* alone while the rest gave *nu* in combination with water or juice. Water alone was given by 27 out of the 46 mothers and the rest gave water with other drinks.

Table 7. First drink other than milk given to survey infants (n=202)

First Drink	N	%
Nu	156	77.2
Water (boiled/warm or plain)	46	22.8
Juice (all kinds)	32	15.8
Glucose/Sugar water/Soft-drink	5	2.5

Note: Multiple response; percentages do not necessarily add up to 100

Drinks were introduced at an early age. A total of 81mothers (40.1%) reported that they introduced other drinks to their infants at less than one week old. These drinks include *nu*, water, juice and sugar water, either alone or in combination. Counting all mothers who introduced drinks before their infants were one month old, 109 mothers, comprising more than half of the 202 mothers (54.0%), reported that they introduced other drinks to their infants at ages less than 1 month **(Table 8)**.

Most of the mothers (64.4%) used a bottle when they first gave other drinks to their infants. The rest (35.6%) said they used a cup and spoon. No significant association

was found between age of the infant upon introduction of other drinks and the method of giving the drinks (t=0.982, df=200, p=0.327).

Table 8. Age of infant upon introduction of drink other than milk

Age (months)	N	%	Cum %
< 1	109	54.0	54.0
1 - < 4	56	27.7	81.7
4 - < 6	16	7.9	89.6
6 - < 12	18	8.9	98.5
12 - <24	3	1.5	100.0
Total	202	100.0	

Mothers gave several reasons for introducing other drinks to their infant. However, the most common reason given by 45.5% of mothers pertained to breast-milk supply problems **(Table 9).** Mothers usually said that their breast-milk was *"not enough"* for their baby. Other reasons included: mothers had a *"big baby"*; baby was *"still hungry"*; *"baby was crying"* after breast-feeding; and mothers needed to give other drinks to *"top-up breast-milk"*; or *"fill-up baby's stomach"*. Five mothers said that they had breast-milk flow problems, saying that their breast-milk had not *"come in"* yet or took several days to *"come"*.

Table 9. Reasons for giving first drink other than milk to survey infants (n=202)

Reason	N	%
Not enough breast-milk/breast-milk not flowing/baby still hungry	92	45.5
To get rid of jaundice/"yellow in eyes"/clean out baby's system/clear bowels	26	12.9
Advised by nurse/doctor/others (mother*, grandmother* and friends with children)	25	12.4
For variety/right time	24	11.9
Mum working/busy	10	5.0
Good for baby/nutritious	4	2.0
Given by nurse in hospital	4	2.0
Way we do things/traditional drink	3	1.5
Sore nipple	2	1.0
Other	13	6.4
Don't know	1	0.5

Note: Multiple response; percentages do not necessarily add up to 100
* refers to relationship to the mother and not the infant

A total of 25 mothers (12.4%) said that they were advised by others to give the first drink other than milk to baby. Of these, nine were advised by nurses. Four mothers

reported they were advised to give *nu* by a nurse and another one was advised to give *nu.* water and juice. These mothers gave the drinks when the baby was less than one week of age. One mother further explained that *nu* was advised because she had *"no breast-milk"*. Other instances where the nurse advised the mother to give other drinks are the following: *nu* at two weeks of age to *"get rid of yellow in eyes"*; *nu* and water at four weeks for hiccups: and *nu* at 13 weeks (3 months) since the baby had a virus. Mothers also reported that the hospital nurse gave *nu* (three mothers) or glucose (one mother) at the hospital during the first week of life of their infants. Two mothers further explained that this was done since she had *"little milk"*; the other was asleep and the nurse did not wake her up.

One mother said she gave pawpaw juice to her child before it was one week old because she heard from a doctor that it had *"lots of iron"*. Other advice came from relatives of the mothers such as their own mothers, aunts and grandmothers. The most common drink advised was *nu.* Reasons given include *"to clean jaundice"* (at 8 weeks); it is the *"best drink for baby"/"nutritious"* (at 4 and 13 weeks); it is the *"right time"* to give to baby (4 weeks).

Nu was given by eight mothers to get rid of *"jaundice"* or *"yellow in eyes"*. A total of 18 mothers said that both *nu* and water were good for *"digestion"* or to *"clean out the insides"* of the baby. Three mothers said that *nu* was the traditional drink to give to babies. *"Going back to work"* was cited by 10 mothers.

First food introduced to survey infants

Table 10 lists the first food given by 167 mothers (206 less 39 who gave drinks only) to their infants. Baby food/cereal/rice and fruits, either alone or in combination with other foods, were equally popular as the first food for infants. Of the 70 mothers who gave baby food/cereal/rice, 54 (77.1%) gave baby food/cereal only and the rest gave it with other food. Pawpaw was the most common fruit given by mothers. In addition, vegetables were given by 15.0% of mothers and fish and chicken/egg by 5.4%.

Table 10. First food other than milk given to survey infants (n=167)

Food	n	%
Baby food/cereal/rice	70	41.9
Fruit	68	40.7
Vegetables	25	15.0
Custard/Yoghurt/ice cream	11	6.6
Fish/chicken/egg	9	5.4
Other	3	1.8
Cannot remember	1	0.6

Note: Multiple response; percentages don not necessarily add up to 100

Foods were given at later ages than drinks. The earliest reported age of introduction of food was at three weeks by only three mothers who gave pawpaw; taro leaves and

pawpaw; and Weetbix®, respectively. Comparing **Tables 8** and **11**, 45.1% of mothers introduced other foods at less than 4 months compared to 81.7% who already introduced drinks to their infants.

Reasons for giving first foods to infants are listed in **Table 12**. Not having enough breast-milk was again the most common reason given by 39.5% of mothers. *"Baby always hungry"* or *"needed more than breast-milk"* and *"baby drinking a lot"* were some of the other reasons that mothers cited to indicate that their supply of breast-milk was not able to cope with the demands of their infants. Some mothers said that *"baby staring"* at the food or at *"other people eating"* was a sign that their babies wanted the food. Baby being at the *"right age"* for food was the next reason most commonly cited. Foods were also given as *"introduction to solids"* and to *"help baby grow healthy and strong"*.

Table 11. Age of infant upon introduction of food other than milk

Age (months)	N	%	Cum %
< 1	3	1.8	1.8
1 - < 4	71	43.3	45.1
4 - < 6	52	31.7	76.8
6 - < 12	38	23.2	100.0
Total	164	100.0	

n missing = 3

Table 12. Reasons for giving first food other than milk to survey infants (n=167)

Reason	n	%
Breast-milk not enough/baby still hungry	66	39.5
Right time to introduce solids	58	34.7
To make baby grow healthy/strong	15	9.0
Advised by nurse/doctor/others	13	7.8
Baby refused breast-milk/milk	4	2.4
Given by others	3	1.8
Mum working	2	1.2
Way we do things	2	1.2
Other	7	4.2

Note: Multiple response; percentages do not necessarily add up to 100

A total of 13 mothers said they were advised to give foods to their infants and three mothers said that food was introduced to their infant by other people. The most common food advised by others was fruit; specifically pawpaw. The same mother who introduced pawpaw juice in the first week of life since a doctor said it had *"lots of iron"*, introduced pawpaw flesh to her infant at 13 weeks (3 months) for the same

reason. One mother reported she was advised by a nurse to give Weetbix® at 17 weeks (4 months).

Factors associated with age of introduction of drinks and foods to survey infants

Statistical tests were done to determine whether age and employment status of the mother were associated with the age of introduction of drinks and foods to the survey infants. Results show that age of the mother was not significantly associated with age of introduction of drink (F=3.453, df=2, 197, p=0.178) and food (F=0.428, df=2, 159, p=0.653). On the other hand, mothers who did not work gave their infants their first drink and food later than employed mothers (**Table 13**). The differences in the mean age of introduction of drinks and foods were 0.8 and 0.9 months, respectively. Amongst employed mothers, working full or part-time was not significantly associated with the age of introduction of drinks and foods (p>0.05). Experience of problems in breast-feeding the survey infants was found not to be associated with the age of introduction of food (p>0.05). On the other hand, mothers who did not experience problems breast-feeding introduced other drinks to their child at 1.9 months of age, while mothers who experienced some problems introduced other drinks at around one month. This relationship was significant but not at the conventional level (K-W=3.0, df=1, p=0.08).

Table 13. Association between work status of mothers and age (months) of introduction of drink and food other than milk

Work Status	Age of infant			K-W	p
	N	Mean	sd	(df)	
Introduction of drink					
Employed	113	1.4	2.4	K-W=3.78	0.052
Not employed	80	2.2	3.5	(1)	
(n missing = 9)					
Introduction of food					
Employed	93	3.7	2.1	t= 2.46	0.015
Not employed	63	4.6	2.2	(155)	

Breast-feeding of children born before 1992 and penultimate children

In 1992, a campaign was launched to promote appropriate feeding practices for infants from birth to two years with special emphasis on exclusive breast-feeding as advocated by WHO/UNICEF. To determine if the campaign had an impact on the proportion of breast-feeding mothers in Rarotonga, mothers in the survey were asked if they breast-fed their child born before 1992. A total of 123 mothers had children born before 1992. Of this number, 86.2% said they had breast-fed their children. Based on Table 1F, Annex F, which shows that 5 out of 207 mothers never initiated breast-feeding, the proportion of mothers who had ever breast-fed their survey infants was 202 out of 207 or 97.6%. **Table 14** compares the breast-feeding practice of 120 mothers who had both children born before 1992 and infants in the current survey. There were 103 mothers who reported breast-feeding their children born before 1992.

All of these mothers breast-fed their survey infants. In addition, out of the 17 mothers who did not breast-feed before 1992, 16 breast-fed their survey infants. McNemar's Chi-square test showed a significant increase in mothers who breast-fed their infants from 1992 to the infants in the present survey (χ^2=16.0, df=1, p<0.001).

Table 14. Comparison of breast-feeding of children born before 1992 and survey infants

Breast-feeding	Child before 1992		Survey Infant	
	n	%	n	%
Yes	103	85.8	119	99.2
No	17	14.2	1	0.8
Total	120	100.0	120	100.0

McNemar's Chi-square= 16.0, df=1, p<0.001

Mothers were also asked whether they breast-fed their penultimate child. Of the 151 mothers with two or more children, 94.7% said they had breast-fed their penultimate child. **Table 15** compares the breast-feeding practice of 144 mothers with their penultimate child and survey infant. All but one mother who breast-fed their penultimate children also breast-fed the survey infants. In addition, six out of seven mothers who did not breast-feed their penultimate children breast-fed their survey infants. McNemar's Chi-square test did not show a statistically significant increase at the conventional level of p<0.05, between the breast-feeding practices of the 144 mothers with regard to their penultimate and survey infants (χ^2=3.6, df=1, 0.05<p<0.10).

Table 15. Comparison of breast-feeding of penultimate child and survey infant

Breast-feeding	Penultimate child		Survey Infant	
	n	%	n	%
Yes	137	95.1	142	98.6
No	7	4.9	2	1.4
Total	144	100.0	144	100.0

McNemar's Chi-square = 3.6, df=1, 0.05<p<0.10

Duration of breast-feeding of penultimate children

To determine the duration of breast-feeding, mothers with two or more children and who said they breast-fed their penultimate child (n=143) were asked at what age they stopped breast-feeding their penultimate child. Responses ranged from one month to 48 months. Clustering of answers was noted at 3, 6, 12 and 24 months. Answers are summarised in Table 2F, Annex F. About one fifth (21.4%) of the mothers reported that they stopped breast-feeding within 1 to less than 4 months of age. At age less than 6 months, about a third (29.3%) of the mothers had already stopped breast-

feeding. This increased to 59.3% just before 1 year of age. Twelve mothers (8.6%) breast-fed until their children were 2 years old. Seven mothers breast-fed until 3 years and six until their children were 4 years old. Nine mothers said that as of the survey, they had not stopped breast-feeding their penultimate children. Ages of these children were not collected. The median[1] and mean duration of breast-feeding the penultimate children were 8 and 12 months (sd=12.3), respectively.

First drink and food introduced to penultimate children

Tables 3F and 4F, Annex F list the first drinks and foods given by 152 mothers (with two or more children) to their penultimate children. As in the survey infants, *nu* was the most common first drink other than milk introduced by mothers to their penultimate children, followed by water and juice. Pawpaw juice was also the most common juice, given by 25 out of the 31 mothers who first gave juice to their penultimate children. Fruits (especially pawpaw flesh) were the most common first food mentioned by mothers, followed by baby food/cereal. These two major types of food were also the most commonly mentioned first food given by mothers to their survey infants.

Mothers reported later ages of introduction of first drink to their penultimate children compared to their survey infants. A total of 36 mothers (27.5%) said that they gave the first drink other than milk to their penultimate children before they were one week old compared to 40.1% of the survey infants at the same age. Before they were one month old, 54.0% of survey infants were already given their first drink other than milk compared to 37.4% of the penultimate children (**Table 8** and Table 5F in Annex F). Between birth and less than 4 months of age, 81.7% of survey infants already had their first drink compared with 69.5% of penultimate children. Results of the matched t-test done to determine if there is a significant difference in the age at introduction of first drink to the survey infants and penultimate children reported by 120 mothers are shown in Table 6F, Annex F. The results confirm that mothers gave the first drink to the survey infants at significantly earlier ages compared to their penultimate children ($t=2.8$, $df=119$, $p=0.005$).

Mothers also generally gave the first food other than milk to their penultimate children at later ages compared to their survey infants, but the difference is not as pronounced. **Table 11** and Table 7F in Annex F show that 45.1% of survey infants received their first food before 4 months as against 35.6% of penultimate children. For children 6 months and older, the proportions are 23.2% of survey infants compared to 34.1% of penultimate children. Results of matched t-test (Table 6F, Annex F) show that reported age of introduction of first food other than milk to the penultimate children and survey infants of 94 mothers did not quite reach significance ($p=0.06$).

Breast-feeding problems in previous children and survey infants

Almost one quarter (23.4%) of the mothers with two or more children said they experienced some problem breast-feeding their previous children compared with

[1] The median was calculated using the conventional mathematical method and not using the WHO (14) methodology. The data, as collected, precluded the use of the WHO methodology.

20.0% of mothers who experienced or were experiencing difficulties breast-feeding their survey infants (**Table 16**). Calculation of odds ratio revealed that compared to those who did not experience problems breast-feeding previous children, mothers who had experienced breast-feeding problems with previous children were three times more likely to experience problems breast-feeding the survey infant (OR=3.68, CI=1.40, 9.69, p=0.004). On the other hand, **Table 17** shows that there is no association between experience of breast-feeding problems (yes/no) in previous children and breast-feeding practice for survey infants (OR=0.00, CI=0.00, 5.30, p=0.230). Of the 32 who experienced problems with previous children, all except one ever breast-fed their survey infant. Similarly, no significant association was found between experience of problems with previous children and the different types of infant feeding practices (p>0.05) for the survey infant.

Table 8F in Annex F lists breast-feeding problems experienced by the mothers with their previous children. Problems with the survey children were similar to problems with previous children. Nipple and breast problems were the most commonly cited problems (43.2%). Milk supply or flow problems were mentioned by 15.9% of mothers. Refusal of baby to take breast-milk was mentioned by three mothers while one mother said she did not know how to breast-feed her previous child.

Table 16. Association between breast-feeding problems with previous children and breast-feeding problems with survey infants (n mothers=145)

Breast-feeding problems	Previous children		Survey infant	
	n	%	n	%
Yes	34	23.4	29	20.0
No	111	76.6	116	80.0
Total	145	100.0	145	100.0

Odds ratio = 3.68, CI=1.40, 9.69, p=0.004

Table 17. Association between breast-feeding problems with previous children and breast-feeding practice with survey infants (n mothers=139)

Breast-feeding problem with previous children		Breast-feeding of survey infants			
	n	yes	%	no	%
Yes	32	31	96.9	1	3.1
No	107	107	100.0	0	0.0
Total	139	138	99.3	1	0.7

Odds ratio=0.00, CI=0.00, 5.30 p=0.230

Source of information on breast-feeding

The majority of mothers (71.2%) identified medical and allied workers as their source of information on breast-feeding with nurses accounting for 65.3% of responses (**Table 18**). Relatives and friends, especially the mother's mother/mother-in-law,

were likewise important sources of information as they were cited by 48.2% of mothers. Only 7.7% of mothers identified forms of mass communication such as the radio, television and pamphlets/books and formal or informal education (schools and health workshops). Ten mothers (4.5%) said they were self-taught either from experience or from their own research. Sixteen mothers (7.2%) said that they did not receive or were not given any information on breast-feeding.

Table 18. Mother's source of information on breast-feeding (N = 222)

Source	n	%
Medical and allied workers		
Doctor	2	0.9
Nurse (unspecified)	5	2.3
Ante-natal clinic nurse	19	8.6
Hospital nurse	50	22.5
Public health nurse	71	32.0
Midwife	10	4.5
Nutritionist	1	0.5
Media		
Books/pamphlets	9	4.1
TV/Radio health programme	5	2.3
School/health workshop	3	1.4
Family and friends *		
Mother/Mother-in-law	59	26.6
Grandmother	15	6.8
Sister/Sister-in-law	15	6.8
Aunt	10	4.5
Cousin	2	0.9
Spouse	2	0.9
Friends	4	1.8
Self-taught/research/experience/instinct	10	4.5
None received/none given	16	7.2

no response = 10
Note: Multiple response; percentages do not necessarily add up to 100
* refers to relationship to the mother and not the infant

Observations and notes on infant feeding practices

As mentioned in Section 2 in the methodology, at some clinics, survey team members generated general group discussions and face-to-face interviews. They were thus able to collect qualitative information about infant feeding practices and the factors that influence those practices. The group discussions and interviews were unstructured. However, they do provide some understanding of mothers', grandmothers', babysitters' and PHNs' knowledge, attitudes and behaviour with regard to infant

feeding practices. Respondents gave their reasons and interpretations about various infant-feeding issues.

The information gathered from the discussions and interviews was recorded and used to identify the social/cultural factors that influence infant feeding practices in Rarotonga. Listed below are first, some general observations, and second, identified influences. Direct quotes are given in *italics*.

General observations

- When some mothers go to work, many infants appear to be given foods/drinks during work hours other than breast-milk. It seems that the practice of expressing breast-milk is not common.
- A few cases have been reported where *nu* is given by the nurse if the mother's milk *"doesn't come"* straight away.
- There appears to be a belief that colostrum is not "milk". Some mothers were not feeding it to their babies and were waiting until the mature milk comes. It seems very common for mothers to report that their milk does not come for three days.
- It was often noted that infant feeding practices recorded in infant records held at the clinics differed to what was reported by mothers. Usually mothers reported that foods/drinks were introduced later than the records indicated.
- It appears to be common for babies to be raised by grandparents or other family members. The ones that are not officially adopted are called *"feeding babies"*.
- It seems that mothers will introduce water or *nu* to get rid of jaundice. Jaundice was often described as yellow skin, yellow in the eyes, and in one case *"yellow fever"*. Cleansing the baby of wastes is also a common reason for early introduction of fluids other than breast-milk. One mother explained that *"too much milk clogs up the system"*; thus, *nu* is given to help with digestion.
- A fear of not having enough breast-milk seems to be common amongst mothers.

Influencing factors

1. Family members: Grandmothers appear to have considerable influence over what is fed to their grandchildren. In one case a mother of a 2.5-month baby reported that her biggest obstacle throughout her pregnancy and in raising all of her children was her own mother. Her mother would tell her to feed her baby *nu* and paw paw juice, yet she had read about exclusive breast-feeding in books. The mother exclusively breast-fed despite the demands of her mother and reported that when her mother saw how well her babies were growing on breast-milk alone, she did not interfere again. The mother reported that she alone took the initiative to educate herself on breast-feeding, but believes that other young mothers are uneducated about feeding infants and are at a vulnerable stage when pregnant and bringing up a newborn. This will lead them to take the advice from their own mothers as they *"don't know any differently"*.

In another example, a mother gave *nu* to her baby at one day old. Her own mother advised her to do this *"for breast-milk to be richer"*.

One interviewee reported that there were many grandmothers who had taken over the care of children, which is a common practice in the Cook Islands. In most cases, where breast-milk had been given before, the grandmother had switched them to *nu* and pawpaw juice. In another case, pawpaw juice was given to the baby by the grandmother so the baby, being satisfied with the juice, did not take any breast-milk. The mother's milk eventually dried up. Another mother reported that grandmothers may give infants *nu* while the mother is at work, whether this is the mother's wish or not.

2. Signs of insufficient breast-milk: Some mothers appear to be interpreting a baby's open mouth after feeding as a sign that the baby wants more food. This may in fact be a developmental reflex, whereas mothers may feel it is a sign that they do not have enough breast-milk. Another mother reported that the way the baby sucked changed to a pulling/tugging of the nipple, and interpreted this as a sign that she did not have enough breast-milk. Many mothers have indicated that the baby crying is a sign that they wanted more food/drink. One father said that solid food was introduced because the baby *"looked like she wanted food"* by chewing her hand and looking at her parent's food.

3. Positioning: One PHN reported that she observed a change in breast-feeding positioning since attending a breast-feeding workshop in 1995. The Cook Islands way is to lay baby flat in the mother's arms and turn the baby's neck towards the breast. This made attachment difficult and mothers had many problems breast-feeding their babies (this may cause possible lower back problems for the baby). The PHN reported that the correct positioning is to lay the baby on their side facing the breast. She said the transition towards moving babies onto their sides has been very slow because Cook Island women have practised their breast-feeding positioning for hundreds of years. She reported that she now has younger mothers using the correct positioning methods and has noticed that the mothers have better attachment and less breast-feeding problems.

There was additional evidence to support this observation. Some mothers reported that the baby did not want the breast, or couldn't successfully maintain breast-feeding. Further prompting indicated that perhaps the positioning of the baby could be incorrect. Another mother reported that she had problems breast-feeding her last child due to cracked and bleeding nipples, which she states was because she was not taught how to position her baby.

4. *Nu*: Many infants were given *nu* before they were one month old. According to the mothers and grandmothers, the practice is traditional and has been handed down through the generations. Thus, one mother reported that she gave *nu* to her baby while in hospital, without the knowledge of the hospital nurses. Also, it was reported by a PHN that *nu* is sometimes given to newborn babies at Rarotonga Hospital because the mothers demand it. However, according to a PHN, there is no tradition for feeding *nu* to newborn infants in hospitals. She said it was a habit that had developed over the years.

It is believed that *nu*/water helps to soften the infant's stool. One mother reported that she started her baby on *nu* at one month to help with digestion as *"too much milk clogs up the system"*.

Nurses at the hospital may also advise mothers to give *nu* if the baby appears not to be satisfied with the milk. For example, one mother reported that the hospital nurse gave *nu* to her infant *"because the milk wasn't coming out well"*. One mother also reported that PHNs and hospital nurses may encourage the use of *nu* at a very young age to help treat medical problems such as jaundice.

5. Colostrum: One mother reported that she did not breast-feed because she had no milk, only *"yellow stuff"*, which was not enough. She did not understand that colostrum was the first breast-milk. This may explain why some mothers said they had no milk for the first one to three days after delivery.

One mother reported that she gave *nu* to her infant after one day because her milk had not *"come in"* yet. Her milk came at three days. This 'three-day' figure seems to be common and appears to indicate that mothers do not consider the colostrum as a food to be given to their babies or that colostrum alone is enough for their newborn infants.

6. Maori medicine: Maori medicine is a range of traditional medicines used by Cook Island Maoris. One PHN stated that Maori medicine may be taken later in pregnancy (around 8 months) to "make labour easier". The PHN stated that she has observed that labour is in fact easier if this practice is followed. The practice seems to be encouraged at antenatal clinics, especially if the urine is dark (it is advised that Maori medicine be taken to make it lighter in colour).

The PHN reports that Maori medicine may be given by mouth to babies by the mothers after the baby goes home from hospital, for a variety of health reasons (for example, thrush in the mouth) but without their doctor's knowledge. The medicine may cause the baby to get diarrhoea or "stomach problems", but this is the "cleansing" effect of the medicine and disappears after a day or so. It is a cultural practice not routinely recommended by health personnel. Maori medicine may also be added to babies' bath water to treat rash.

7. Work: One mother reported that as she had to work, the baby got used to having a bottle during her work hours, so she stopped breast-feeding. This mother did express breast-milk for the sitter, but when the sitter ran out of the expressed milk, *nu* would be given. The mother stated that *nu* is fresh, easy, doesn't have to be cooked, and sugar does not have to be added.

Another mother reported that she believes that breast-milk is the best milk for her baby but could not continue breast-feeding due to work commitments. She believes that six weeks maternity leave is not adequate and suggests two months, as baby *"needs breast-milk more often"*.

8. Mode of feeding: One mother said that she did not have enough breast-milk for her infant so she also gave *nu*. She was observed giving *nu* first to her baby, followed by breast-milk. Another mother said that she gave one breast at one meal and the other breast at the next meal, and found that this was not enough for her baby. Thus, she introduced other drink and food to her baby.

9. Mother's illness: One mother reported that she felt it was not safe to feed her baby with breast milk because she had been affected by fish poisoning. As the milk was

still coming, she expressed it and discarded it. She said she would not feed her child breast-milk again because she was *"scared it may have the poison in it"*.

DISCUSSION

The survey sample

The survey was conducted to provide a comprehensive description of the infant feeding practices of Rarotongan mothers with infants less than 24 months old. The survey reached nearly 100% of mothers with infants in this age group regularly attending the clinics in Rarotonga during 20 April to 21 May 1998.

Infant feeding practice

The survey revealed that although 90.6% of mothers with infants less than four months were breast-feeding, only 18.9% were exclusively breast-feeding. Even amongst mothers with infants less than one month of age, the proportion practising exclusive breast-feeding was only 36.4%. The high proportion of mothers predominantly breast-feeding (60.4%) infants less than four months old shows that the predominant source of nourishment of these infants was breast-milk but they also receive other fluids. These results fall below the UNICEF and WHO recommendation that 100% of infants should be exclusively breast-fed for at least the first four to six months of life. All the nutritional requirements of infants can be satisfied by breast-milk alone until they reach four to six months of age (10).

Using WHO procedure (14), the survey found that half of the mothers in the sample stopped breast-feeding when their infants reached seven or eight months. This was also shown in **Table 5** wherein more than half of the mothers were giving formula/cow's-milk without breast-milk to their infants six to less than ten months old. The survey found only about a third of mothers follow the WHO/UNICEF advice of giving breast-milk for up to two years. Although breast-milk no longer provides the bulk of the nutritional needs of older children, continued supplemented breast-feeding after six months has been shown to provide protection against infection into the third year of life (16).

The high proportion of mothers predominantly breast-feeding very young infants also indicates that mothers introduced additional drinks or fluids to their infants at a very young age. Specifically, 54.0% of mothers said that they introduced additional drinks to their infants aged less than one month. In addition, the majority of the mothers said that they used a bottle when they first introduced other drinks to their infants. Although solid foods were introduced by mothers at generally older ages than additional drinks, still a high proportion (45.1%) of infants received their first solid food before four months of age. These results show that compliance with the WHO/UNICEF advice of not giving additional drinks or food for the first four to six months and avoidance of bottles and teats when giving additional drinks, is low. Use of bottle and teat when giving other fluids at this early age "*. . . reduces the infant's sucking capacity and therefore the mother's lactation stimulus. Furthermore, such practices increase the risk of introducing infection. . .*". In addition, giving additional drinks before four months is *"unnecessary on nutritional grounds"* ((10), p. 21).

Nu (coconut water) was the most common first drink introduced to the survey infants. This was supported by the group discussion and face-to-face interviews. Mothers and grandmothers regard it as a traditional and/or cultural practice. *Nu* is nutritionally inferior to breast-milk. **Table 19** shows a comparison between breast-milk and *nu*. It can be clearly seen that *nu* is insufficient in energy, protein, vitamin A, thiamine, riboflavin and niacin: it contains far too much sodium and potassium. Additionally, the carbohydrates in *nu* are not in the same form as breast-milk and the bio-availability of carbohydrate and iron in *nu* is questionable. *Nu* cannot be a substitute for breast-milk.

Table 19. Nutrient content of breast-milk and *nu*

Constituent (per liter)	Breast-milk	*Nu*	
Energy (kcal)	690	230	
Protein (gm)	9	3	
Fat (gm)	40	2	
Lactose (gm)	68	50	*
Vitamins			
Vitamin A (IU)	1898	0	
Vitamin D (activity)	40	–	
Vitamin E (IU)	3.2	–	
Vitamin K (µg)	34	–	
Thiamine (µg)	150	0	
Riboflavin (µg)	380	0	
Niacin (mg)	1.7	T	
Pyridoxine (µg)	130	–	
Folic acid (µg)	41–84.6	–	
Cobalamine (µg)	0.5	0	
Ascorbic acid (µg)	44	30	
Minerals			
Calcium (mg)	241–340	290	
Phosphorus (mg)	150	–	
Sodium (mg)	160	1100	
Potassium (mg)	530	3100	
Chlorine (mg)	400	–	
Magnesium (mg)	38–41	–	
Sulphur (mg)	140	–	
Iron (mg)	0.56–0.3	1	
Iodine (mg)	200	–	
Manganese (µg)	5.9–4.0	–	
Copper (µg)	60	–	
Zinc (mg)	4–0.5	–	
Selenium (µg)	20	–	
Fluoride (mg)	0.05	–	
Chromium (µg)	4	–	

* available carbohydrates only; *nu* does not have lactose
T: trace, less than the limit of detection
–: not analysed
Sources: (17,18)

An experienced PHN said that giving *nu* to infants in hospitals is a habit developed over the years. There is some evidence that supports this. In their report on the 1989 survey, Matenga-Smith and Terrell-Perica explained that it was a common practice in hospitals to provide fluids to infants *when women experienced delays in breast-feeding* (italics supplied) (1). Glucose water was first provided in hospitals many years ago. However, the authors stated that by 1989, glucose water had been replaced by coconut water or *nu*. If this is the case, then this exemplifies the way in which maternity and infant services in hospitals may support inappropriate feeding practices.

Survey results also revealed that some mothers and some PHNs give *nu* or water to treat jaundice in infants. Some jaundice (called normal or physiological jaundice, a yellowing of the skin and eyeballs) appears in many healthy, full-term babies at two or three days of life and clears by the tenth day. This type of jaundice is not a sickness. It is usually due to slight immaturity of the infant's liver. Jaundice is also partly caused by the infant not getting enough breast-milk (late initiation of breast-feeding or infant not breast-feeding often enough). Continued feeding of breast-milk, especially colostrum, helps get rid of the jaundice. Treatment is necessary only in cases of severe jaundice. However, giving water or other fluids is not recommended, whether for the normal jaundice or more severe jaundice. This practice may complicate or worsen the situation by decreasing the amount of breast-milk consumed by infants (19,20).

Encouraging mothers not to give *nu* (and other drinks and solids) during at least the first four to six months of life should be explained by all health care providers from the ante-natal clinics, to the hospital and to the CHCs. The hospital may need to re-assess its post-natal protocol and staff capabilities vis-à-vis the 10 steps to successful breast-feeding to ensure that breast-feeding is established early and maintained throughout the mother's stay in the hospital. The same assessment of PHNs may be done to ensure that a uniform approach to this problem is undertaken. It is acknowledged that since *nu* is regarded by some mothers and grandmothers as traditional practice, the change from early supplementation to exclusive breast-feeding may be difficult.

The present survey was not designed to obtain information on the amount of breast-milk and other drinks and foods consumed by infants. Hence, the proportion of complementary foods and drinks to total consumption of the infants is not known. Are the total amount of foods and drinks (including breast-milk) consumed due to early introduction of other drinks and foods over and above the requirements of the infants? If so, would this be one of the reasons why Rarotongan infants have been found to have weight-for-age Z-scores more than 1 sd above the current NCHS/WHO mean (as discussed by Tairea, Hughes, Hughes, et al. (8))? Two studies, one in Honduras (experimental design) and one in the USA (observational study), explored this issue. Both studies followed up the intake of breast-milk and complementary foods and growth of infants. In the USA study, early supplementation was defined as the introduction of solid foods at 16 weeks (4 months) but before 26 weeks (6 months) and late supplementation as introduction of solid foods at 26 weeks or later (>=6 months) (21). In the Honduras study, supplementation was also started at 16 weeks (22). Results of the USA study show that infants in the early supplementation group consumed less breast-milk than the late supplementation group so that total energy intake did not differ between the two groups. The Honduras study had similar

results, concluding that breast-fed infants self-regulate their total energy intake (by decreasing nursing frequency and duration) when foods are introduced. In addition, there was no difference in the Honduras study between the growth of those infants who were exclusively breast-fed for 6 months and those who received solids starting at four months. The USA study also did not find any significant relationships between timing of solid food introduction and weight-for-age, length-for-age or weight-for-length. Because supplementation in both studies started at four months, it is not known whether solid foods given to infants at less than 4 months old (as was found in 45.1% of mothers in the present survey) would result in complete energy replacement of breast-milk. Or, if energy from the food would be additive (whether full or partial) to energy intake from breast-milk.

Factors associated with infant feeding practice

Before the survey was conducted, there was some suspicion that mothers' outside employment may have some detrimental effects to infant feeding (specifically exclusive breast-feeding). No significant difference was found in feeding practice between those who were employed and those who were not. On the other hand, working mothers introduced food and drink to their infants about one month earlier than non-working mothers. On average, both sets introduced food and drinks earlier than recommended by WHO/UNICEF.

A significant association between time of initiation of breast-feeding and exclusive breast-feeding was found in this survey. Exclusive breast-feeding was 10 times more common amongst those who initiated breast-feeding within one hour after birth than amongst those who first started breast-feeding one hour after birth for mothers with babies less than four months. This is significant and shows that vast improvements in exclusive breast-feeding may be achieved by providing expert support at this vulnerable time. According to WHO, successful initiation of breast-feeding is most likely to occur when breast-feeding is started as soon as possible after birth (16). If this is the case, mothers who initiate breast-feeding early, may be more able to maintain exclusive breast-feeding longer.

Breast-feeding problems

A similar proportion of mothers had problems with breast-feeding survey infants as with breast-feeding previous children. It was also shown that those who experienced problems breast-feeding their previous children are more likely to experience problems breast-feeding the present children. Results show that problems in breast-feeding both the survey infants and penultimate children were not significantly associated with infant feeding practice. A better understanding of the relationship between problems encountered and feeding practice could have been achieved if the survey design included further questions on actions taken by mothers who experienced breast-feeding problems. However, early occurring breast-feeding problems could possibly be alleviated with the provision of support as explained in the previous paragraph.

The most common problems cited by mothers in breast-feeding their survey and previous children were breast, nipple and milk-supply problems. Not having enough breast-milk was also the most common reason given by mothers for introducing other

drinks and solids to their infants. This fear of not having enough breast-milk, called the *insufficient milk syndrome*, has been recognised as the most common reason for early supplementation (16). This is due to the mother's lack of confidence in her ability to produce milk (quantity) and in the adequacy of her breast-milk to meet the nutritional needs of her infant (quality) (10,16). These fears are usually unfounded (10) but are very real to the mothers and result in early termination of breast-feeding or early introduction of other drinks and foods.

Some mothers said that it took three days for their breast-milk to come in after birth so that they had to introduce other foods and drinks to their children. Milk "coming-in", which is sensed by mothers as a sudden enlargement of their breasts with milk, does occur two to three days after delivery (23). However, before that time, a yellowish, transparent fluid called colostrum, is secreted (17). Thus, the early introduction of other foods and drinks before the "coming-in" of milk may indicate that there are misconceptions about colostrum amongst some Rarotongan mothers. Some mothers may think that colostrum is not breast-milk and is not supposed to be given to their infants. Secondly, some mothers may think that colostrum is not sufficient for their infants (in terms of quality and quantity). Amongst Caucasians, the average breast-milk volume during the first 24-hour period was found to be 56 ml compared to an average of 682 ml at the 10th day postpartum, when colostrum has already been replaced by mature milk (24). This is understandable when the volume of a 3,000 gram newborn infant's stomach averages 10 to 20 ml (17). The small amounts of colostrum secreted may explain why mothers think that their milk during the first days after birth is not sufficient. In terms of quality, colostrum provides nutrients in concentrations appropriate for infants at this stage of life (17). It also has high concentrations of antibodies that provide protection from diseases (16).

Breast and nipple problems, such as breast engorgement and sore/cracked nipples may be the result of incorrect positioning while breast-feeding (10). A mother who is uncomfortable breast-feeding her infant (due to sore/cracked nipples) may also tend to decrease the number of times she breast-feeds her baby. Infrequent feedings not only cause breast engorgement but also result in decreased milk production, which may prompt the mother to supplement early (16). The large proportion of mothers in the survey who cited breast and nipple problems may indicate incorrect positioning amongst Rarotongan mothers. According to one PHN, the traditional Cooks Islands way of positioning resulted in poor attachment and the change to the correct positioning has been slow.

Another breast problem cited by some mothers is mastitis (acute puerperal mastitis). Mastitis is the inflammation of the breast usually caused by bacterial infection through damaged nipples and develops during the period of breast-feeding. However, chronic cystic mastitis has a different cause and does not involve inflammation ((25). It must be assumed that the mothers who reported mastitis as a breast-feeding problem referred to acute puerperal mastitis.

Engorged breasts sometimes may lead to mastitis. This occurs when the breasts are not cleared efficiently by the infant. This can happen when infants are satisfied by other drinks given to them, resulting in less suckling at the breast and ultimately, inefficient removal of milk from the mother's breasts. In this case, continued breast-

feeding (to remove milk from the infected breast) should be done to treat mastitis (13,19).

The misconception of insufficient milk supply and the causes of breast and nipple problems are some major issues that should be addressed in programmes for promoting and supporting exclusive breast-feeding in the Cook Islands.

Change in feeding practice

Table 20 compares the results of the present survey with that of the 1989 survey. It should be noted that the 1989 survey on feeding practices studied infants less than one year old (0 to 11 months) and that the majority (80.0%) of the infants were less than six months old (1). In comparison, data on infants less than one year old in the present survey revealed that only 56.7% were less than six months of age. After adjusting to the age profile of the 1989 survey, the proportion of breast-fed infants less than one year old in the present survey was 80.6%, compared with 68.8% in 1989. This is a significant improvement. However, the age-adjusted proportion of exclusively breast-fed infants less than one year old in the present survey at 12.7% was not significantly different from the 1989 result of 12.5%.

From the above, it appears that the overall rate of breast-feeding has increased since 1989. Since 1992, the Cook Islands Ministry of Health has been actively campaigning for mothers to exclusively breast-feed for four to six months. Due to the lack of a baseline survey before commencement of the campaign, the present survey was designed to obtain information on breast-feeding practice of mothers with their children born before 1992. It is acknowledged that there may be some bias in the results as the mothers were asked to recall their feeding practices six or more years before the survey. Results from the present study show a significant increase in the mothers who breast-feed their infants between 1992 and the present. It is not known whether the rate of exclusive breast-feeding has increased since 1992.

Table 20. Comparison of prevalence of breast-feeding infants less than one year old, 1989[1] and 1998

Age	Age Distribution				Breast-feeding Prev (crude)		1998 BF prev adjusted*	
	1989		1998		1989	1998		
	No.	%	No.	%	%	%	No.	%
0 - 5	43	80.0	76	56.7	–	89.5	107	–
6 - 11	37	20.0	58	43.3	–	43.1	27	–
Total	80	100.0	134	100.0	68.8	69.4	134	80.6

* adjusted using 1989 age distribution and applying 1998 age-specific breast-feeding prevalence

[1] Source: (1)

The present survey also compared the time of introduction of other drinks and foods to the survey infant and penultimate infants. Results seem to indicate that mothers are giving supplements earlier now than with their penultimate children. Different

methodologies were used to determine the median duration of breast-feeding of survey infants and penultimate children, due to the method of data collection employed in the present survey. Results show that the median duration of breast-feeding amongst mothers in the survey has not changed from the penultimate to the survey infants. About half of the mothers stopped breast-feeding both their penultimate and survey infants by seven to eight months.

As there was only a 40 per cent response rate in the 1989 survey, it was not possible to compare the results of the present survey with that of the 1989 survey with regard to the timing of introduction of other drinks and food to infants and duration of breast-feeding. On the other hand, a comparison of the most common types of drinks and foods given to infants in 1989 and the present survey (both penultimate and present children) showed that not much change has occurred with regard to types of first supplements given to infants since 1989. These supplements in themselves are not inappropriate as first foods for an infant. The problem lies in the timing of the introduction of these supplements.

CONCLUSIONS AND RECOMMENDATIONS

This is the first survey that has concentrated solely on infant feeding practices in the Cook Islands. The results show that the rates of exclusive breast-feeding (36% of infants less than one month of age, and 14.3% for infants from 1 to less than 4 months of age) are unacceptably low in comparison to the UNICEF/WHO recommendation that exclusive breast-feeding continue until infants are 4 to 6 months old (10). The general rate of breast-feeding was also found to be low at only 56.8% of all mothers with infants aged up to 24 months. Half of the mothers in the study stopped breastfeeding entirely before the end of the eighth month of life of their infant.

The study found that infants were introduced to complementary drinks and foods far too early in life. It was concluded that this would contribute to lower rates of breast-feeding. However, a large proportion (90.6%) of mothers were breast-feeding their infants up to 4 months of age. This may imply that the majority of mothers already know that "breast is best". However, the early introduction of unnecessary supplements suggests that the Cook Islands breast-feeding programme should now focus on encouraging exclusive breast-feeding for the first four to six months and continued breast-feeding up to two years.

While it maybe common practice to feed very young infants (on the first day of life) with *nu*, it should be discouraged, especially in hospitals and CHCs. There is compelling evidence that breast-milk is the only food that provides for an infant's needs for the first four to six months of life. However, for older infants and young children, *nu* would be an appropriate and far better alternative for Cook Island children, both culturally and nutritionally, than such things as imported soft-drinks and fruit juices.

Although the majority of the mothers cited medical and allied workers as their source of information, anecdotal evidence suggests that grandmothers (of the infants) also have a strong influence on present feeding practice, especially early feeding of complementary drinks and foods to infants. This is supported by results shown in

Table 18. One might speculate that the grandmother's knowledge and practice could be based on both the traditional cultural practice *and* hospital procedure (as the changes occurred during their early motherhood years, for example, glucose water to *nu*).

In general, mothers who breast-fed their infants within one hour of birth were ten times more likely to exclusively breast-feed their infants for up to four months of age. This is very significant and shows the importance of the need for breast-feeding support for mothers directly after birth. A mother's confidence to be able to feed her infant solely with her breast-milk and no other drinks or foods begins here. During group discussions, many mothers mentioned that at this time *nu* was introduced to their infants because their breast-milk had not come down. Some were not sure that colostrum was suitable for their infants. Some were not sure that they had enough milk to satisfy their infant's needs. Advice on what to do at this time given by nurses, grandmothers and family was conflicting and confusing for some mothers. The uncertainty of the situation and the inconsistency of advice provides a psychological and emotional barrier for some mothers. Knowledge alone might not overcome these barriers. Clear, correct and unambiguous advice and support, especially psychological and emotional support, should be provided at this time. Perhaps some hospital nurses could be trained as lactation consultants.

The sister study to the present survey found that Cook Island infants were up to 25% heavier for their age during the first 12 months of life than the NCHS/WHO reference (8). From the present study and the sister study no conclusions can be drawn on whether total food intake, including breast-milk, due to early introduction of additional drinks and foods contributes to the heavier weight-for-age of Cook Island infants. It is known that exclusive breast-feeding meets all the nutrition requirements of infants four to six months of age. Additional drinks and foods therefore, by definition will not match exactly the infant's requirements. This imbalance could be over and/or below the requirements of the infants in terms of specific nutrients but may be equal in terms of energy to that of breast milk. Only a follow-up experimental study of a cohort of infants would determine whether the early introduction of drinks and foods contributes to overweight in infancy, childhood and/or adulthood.

Recommendations include the following.

- The Public Health Department continues to support the UNICEF/WHO recommendations on breast-feeding practice, especially exclusive breast-feeding.
- Due to the early introduction of complementary drinks and foods, the Cook Islands breast-feeding programme focuses more on ensuring that barriers to exclusively breast-feeding babies up to six months of age and continuing breast-feeding up to two years and beyond are addressed.
- Clear guidelines are developed for both PHNs and mothers explaining clearly that the premature administration of drinks and foods, is not the best for infants. The benefits of feeding infants breast-milk as opposed to *nu* should be clearly explained. The best advice on breast-feeding can be given by the Public Health Department and hospital maternity nurses.
- The Cook Islands Hospital Services intensify current support of mothers at the time of the birth of their infants. This support should be in terms of readily available expertise on breast-feeding and positioning that provides for the

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ANNEX A

1998 RAROTONGA INFANT FEEDING SURVEY

QUESTIONNAIRE

INFANT FEEDING SURVEY QUESTIONNAIRE
RAROTONGA 1998

PART A

CLINIC: _____ [ ]

Date of interview: [ ]

Name of Interviewer: _____ [ ]

Mother's Code: [ ]

Q 1. Mother's age: [ ] years

Q 2. Are you working? | yes | 1 | no | 2 | [ ] |

Q 3. If yes, | F/T | 1 | P/T | 2 | [ ] |

Q 4. Date of baby's birth: [ ]

Q 5. Baby's birth weight: [ ] grams

Q 6. Baby's weight today: [ ] KGs

PART B

Q 7. Are you breastfeeding your baby? | yes | 1 | no | 2 | [ ] |

(if yes go to question 9)

Q 8. If no, what are you giving baby?

| formula | 1 | Anchor | 2 | Condensed milk | 3 |

Other Specify: _____

Q 9. Do/did you have any problems breastfeeding your baby?

| yes | 1 | no | 2 | [ ] |

(if no go to question 11)

Q 10. If yes, what problems do/did you have? _____

_____

Q 11. How many hours after birth did you breastfeed your baby? [ ]

Q 12. Is your baby receiving food or drink other than _____milk now?
(including water)

| yes | 1 | no | 2 | [ ] |

(if no go to question 15)

Q 13. If yes, what was the first drink that you gave your baby?

_____

a. At what age did you start feeding your baby with this drink?

[ ] days/weeks/months (circle one only)

b. For what reasons did you give your baby this drink?

_____

c. How was this drink given to your baby?

bottle	1	cup/spoon	2

other: specify _____

Q 14. What was the first food that you gave your baby?

_____

a. At what age did you start feeding your baby with this food?

[ ] days/weeks/months (circle one only)

b. For what reasons did you give your baby this food?

_____

PART C

Q 15. How many other babies have you given birth to? [ ]

(if none go to question 22)

Q 16. If you had a child before 1992, did you breastfeed?

yes	1	no	2	No child before 1992	3

Q 17. Did you breastfeed your last child?

yes	1	no	2	

(if no go to question 19)

Q 18. How old was your last child when you stopped breastfeeding?

[ ] months/years (circle only one)

Q 19. How old was your last child when you gave them drink other than milk? [ ] days/weeks/months (circle only one)

What was the first drink you gave to the last child?

Type of drink _____

a. How old was your last child when you gave them food other than milk? [ ] days/weeks/months (circle only one)

What was the first food you gave to the last child?

Type of food _____

Q 20. Did you have any problems breastfeeding previous babies?

yes	1	no	2	

Q 21. If yes, what problems did you have?

_____

Q 22. From whom or where did you get your breastfeeding information?

_____

Thank you for your co-operation

ANNEX B

1998 INFANT FEEDING PRACTICES SURVEY
RAROTONGA

INTERVIEWER'S GUIDE

General Introduction

Hello! My name is _____ from the Public Health Department of the Cook Islands Ministry of Health. We are conducting a survey of all mothers with young children in Rarotonga. Please could you give me some of your time to answer a few questions. Your answers will remain confidential and provide the Department with important information that has not been collected before. We would very much appreciate your cooperation. Thank you.

CLINIC

Refer to list of clinics and corresponding codes

DATE OF INTERVIEW

Use European date format

NAME OF INTERVIEWER and Code

Monique	1
Jeni	2
Karen	3
Janelle	4
Bob	5
Reps	6

MOTHER'S CODE

1. 4 digit code: first two numbers correspond to the clinic code and last two correspond to the code for mother
2. assign mother's codes prior to conducting the interview of mothers
3. copy the code for the mother in the interview questionnaire
4. using a pen, copy the number on the upper right hand corner of the clinic card

Q 1 MOTHER'S AGE

Record in the space provided age as stated by the mother.

Q 2. ARE YOU WORKING?

1. "Working" means paid employment, either self-employed or working for somebody else.
2. If yes, follow up with the question: Where do you work? To eliminate those mothers who are doing unpaid housework.

3. If no, can probe with the question: Do you earn any money?
4. Use answers to the follow-up questions to determine if mother is indeed working or not and encircle the corresponding code.

Q 3. If yes, FT or PT?

1. Use this as follow-up question for question no. 2 only if mother is working.
2. Read out the two classifications to prompt the mother.
3. FT means full-time work as stated by mother.
4. PT means part-time work as stated by mother.
5. Encircle the appropriate code.

Q 4. DATE OF BABY'S BIRTH

Record as stated by the mother.

Q 5. BABY'S BIRTH WEIGHT

Record as stated by the mother.

Q 6. BABY'S WEIGHT TODAY

Record as stated by the mother.

Q 7. ARE YOU BREAST-FEEDING YOUR BABY?

Do not prompt.

Q 8. IF NO, WHAT ARE YOU GIVING YOUR BABY?

1. Remember that this question asks for alternatives to breast-milk only.
2. These include: formula milk, Anchor milk, sweetened condensed milk, Pac Fresh and Zap.
3. Read out the possible answers if the mother doesn't seem to know what to answer.

Q.9 DO/DID YOU HAVE ANY PROBLEMS BREAST-FEEDING YOUR BABY?

This pertains only to the PRESENT or youngest baby. Encircle the appropriate code.

Q 10. IF YES, WHAT PROBLEMS DO/DID YOU HAVE?

List all problems as stated by mother.

Q 11. HOW MANY HOURS AFTER BIRTH DID YOU FEED YOUR BABY?

1. Refer to time of birth recorded in the Clinic Card to use as memory prompt.
2. If mother still cannot recall, focus on the possible events that occurred during the first twelve hours after birth, 12 to 24 hours after and more than 24 hours after birth.
3. Record to the nearest hour.

Q 12. IS YOUR BABY RECEIVING FOOD OR DRINK OTHER THAN (type of milk) NOW?

1. Refer to answers to Q7 and Q8, indicate in space provided the type of milk being given to the baby. This includes breast-milk, formula milk and other milk alternatives.

2. If answer is no, prompt for water, *nu*, pawpaw juice.
3. For breast-feeders, prompt also for formula milk if answer is no.
4. If no, this identifies exclusive breast-feeders.

Q 13. IF YES, WHAT WAS THE FIRST DRINK THAT YOU GAVE TO YOUR BABY?

First drink introduced can include formula milk, water, juice and *nu* (use specific names)

Q13a. AT WHAT AGE DID YOU START FEEDING YOUR BABY WITH THIS DRINK?

Write the number in the space provided and encircle days, weeks or months accordingly.

Q13b. FOR WHAT REASONS DID YOU GIVE YOUR BABY THIS DRINK?

1. Record as stated by the mother.
2. Obtain clarification from mother if answer is not a definable answer or too general such as "it is time to give the drink to the baby".

Q13c. HOW WAS THIS DRINK GIVEN TO YOUR BABY?

1. Read out the possible answers, if necessary.
2. Encircle the appropriate code.
3. Write other answers in the space provided.

Q 14. WHAT WAS THE FIRST FOOD THAT YOU GAVE TO YOUR BABY?

First food introduced can include formula milk, bottled or tinned baby food, cereal, etc. (use specific names). If the answer is formula milk, write it but ask for the next food introduced. Q14a, 14b and 14c pertains to first food introduced other than formula milk.

Q14a. AT WHAT AGE DID YOU START FEEDING YOUR BABY WITH THIS FOOD?

Write the number in the space provided and encircle days, weeks or months accordingly.

Q14b. FOR WHAT REASONS DID YOU GIVE YOUR BABY THIS FOOD?

1. Record as stated by the mother.
2. Obtain clarification from mother if answer is not a definable answer or too general such as "it is time to give the drink to the baby".

Q 15 . HOW MANY OTHER BABIES HAVE YOU GIVEN BIRTH TO?

1. If mother cannot understand the question, use the following:
   "How many children do you have? Did you give birth to all of them?"
2. Count only those children born to the mother (not adopted children).

Q 16. IF YOU HAD A CHILD BEFORE 1992, DID YOU BREAST-FEED?

Q 17. DID YOU BREAST-FEED YOUR LAST CHILD?

1. "Last child" refers to second-youngest child.

2. Ensure that the mother does not confuse "last child" with the one born prior to 1992.

Q 18. HOW OLD WAS YOUR LAST CHILD WHEN YOU STOPPED BREAST-FEEDING?

1. "Last child" refers to second-youngest child.
2. Put number in the box and circle years or months accordingly.
3. Breast-feeding here means "general breast-feeding" as defined in the methodology.

Q 19. HOW OLD WAS YOUR LAST CHILD WHEN YOU GAVE THEM DRINK OTHER THAN MILK?

1. "Last child" refers to second-youngest child.
2. "Milk" refers to breast or formula or any other breast-milk alternatives.
3. Indicate answer in the space provided and circle days, weeks or months accordingly.

WHAT WAS THE FIRST DRINK YOU GAVE TO YOUR LAST CHILD ?

1. Indicate the answer as stated by mother.
2. Answers may include water, *nu*, or pawpaw juice.

Q 19b. HOW OLD WAS YOUR LAST CHILD WHEN YOU GAVE THEM FOOD OTHER THAN MILK?

1. "Last child" refers to second-youngest child.
2. "Milk" refers to breast or formula or any other breast-milk alternatives.
3. Indicate answer in the space provided and circle days, weeks or months accordingly.

WHAT WAS THE FIRST FOOD YOU GAVE TO YOUR LAST CHILD ?

1. Indicate the answer as stated by mother.
2. Answers may include tinned or bottled baby food, cereal, etc.

Q 20. DID YOU HAVE ANY PROBLEMS BREAST-FEEDING PREVIOUS BABIES?

Record answers as stated by mother.

Q 21. IF YES, WHAT PROBLEMS DID YOU HAVE?

Record answers as stated by mother.

Q 22 FROM WHOM OR WHERE DID YOU GET YOUR BREAST-FEEDING INFORMATION?

If family, ask "who?".
If pamphlet, ask who gave it to them.
If hospital, ask who in the hospital.

General instructions:

1. Do not leave any question unanswered.
2. Write at the back of the questionnaire (PTO) if more space is needed.
3. In questions 13a, 14a, 18, 19 and 19a, it is required that you indicate the answer in the space provided and also encircle one of the choices given ALSO.

4. Be aware of the jumps on questions 7, 9, 12, 15 and 17.
5. Review each questionnaire before moving on to the next mother.
6. At the end of each interview day, count all the mothers interviewed per clinic and give the information to Karen who is in charge of keeping a running count of all mothers interviewed vis-à-vis total number of mothers using the clinics.

ANNEX C

1998 INFANT FEEDING PRACTICES SURVEY
RAROTONGA

GLOSSARY

English Term	Cook Island Maori term
Fruit	***Ua Rakau***
Banana (cooked in coconut cream and tapioca starch/pumpkin/paw paw)	Poke
Banana (cooked in coconut cream)	Poi
Banana (ripe)	Meika para
Chestnut	I'i
Coconut (flesh/meat of green coconut)	Kiko nu
Coconut (sprouting coconut)	Uto
Guava	Tuava
Mandarin	Anani papaa
Mango	Vi
Orange	Anani
Pandanus fruit	Ara
Paw paw	Nita
Sour sop/apple custard	Kataraapa
Spondias	Vikavakava
Fluids	
Coconut cream	Tai akari
Coconut water (water of green coconut)	Nu
Milk	U
	Mei te u
Milk (breast)	U mama
Paw paw juice	Vai nita
Water	Vai
Vegetables	***Kai Matamata***
Beans	Pi
Bele	Rukau viti
Cabbage (round/English)	Kapati
Carrot	Karoti
Chinese cabbage	Pinapi
Pumpkin	Motini
Taro leaves	Rukau
Tomato	Tomati
Staples	
Banana (green)	Mario/amoa
Breadfruit	Kuru

English Term	Cook Island Maori term
Cassava/tapioca	Maniota
	Maniota e te vai atura
Potatoes	Petate
Rice	Raiti
Sweet potato/kumara	Kumara
Taro	Taro
Taro (another variety)	Tarua
Yam	Ui
Bread	Varaoa
Protein	
Beef	Pokotoro
Cheese	Titi
Chicken	Moa
Dolphin fish	Mahimahi
Eggs	Uamoa
Fish	Ika
	E te ika
Flying fish	Maroro
Pork	Puaka
Tuna	A`ai
Wahoo	Paara
Yoghurt	Yoghurt

Formulas/Other breast-milk alternatives

Progress – follow on infant formula
Infasoy – infant formula
SMA – infant formula
Anchor – full cream milk powder
UTH/UHT – long life milk
Pacfresh milk
Zap – flavoured milk
Barneys – flavoured milk

ANNEX D

1998 INFANT FEEDING PRACTICES SURVEY
RAROTONGA

CONVERSION OF AGE IN WEEKS TO MONTHS

Age in weeks	Month	Age in weeks	Month
0 - <4	0	52 - <56	12
4 - <8	1	56 - <60	13
8 - <13	2	60 - <65	14
13 - <17	3	65 - <69	15
17 - <21	4	69 - <73	16
21 - <26	5	73 - <78	17
26 - <30	6	78 - <82	18
30 - <34	7	82 - <86	19
34 - <39	8	86 - <91	20
39 - <43	9	91 - <95	21
43 - <47	10	95 - <99	22
47 - <52	11	99 - <104	23

ANNEX E

Cook Islands Public Health Division
NUTRITION SECTION

1998 RAROTONGA INFANT FEEDING SURVEY

CODING MANUAL

Quest. No.	Field Name	Field Type & Valid Codes	Description	Remarks
	CL	Numeric 2.0 1 – 31	Code for clinic	See below for list of clinics & corresponding codes
	DI	European date dd/mm/yy	Date of interview	
	I	Numeric 1.0	Code for interviewer Monique 1 Jeni 2 Karen 3 Janelle 4 Bob 5 Reps 6	
	MC	Numeric 4.0 0101 – 3440	Code for Mother	First 2 digits for clinic code and last two for mother's code To be assigned prior to interview. Mother's code should correspond with codes in the Growth Monitoring data files.
Q.1	MA	Numeric 2.0 14 – 50 NR 99	Age of mother	
Q.2	MW	Numeric 1.0 1 – 2 NA 8 NR 9	Working status of mother 1 – yes 2 – no 8 – not applicable 9 – no response	"Working" means paid employment Use NA (code 8) if Grandma or other feeding child all the time (child not with mother all the time)
Q.3	TW	Numeric 1.0 1 – 2 NA 8 NR 9	Type of work of mother 1 – full time 2 – part time 8 – not applicable 9 – no response	To be answered only if answer to MW is YES. Use NA (code 8) if Grandma or other feeding child all the time (child not with mother all the time)
Q.4	BDATE	European date dd/mm/yy	Date of birth of present/ youngest child as reported by mother	Check against record cards
Q.5	BWT	Numeric 4.0 1000 – 6000 NR 9999	Weight of child at birth in grams as reported by mother	Check against record cards

Quest. No.	Field Name	Field Type & Valid Codes	Description	Remarks
Q.6	PWT	Numeric 4.1 1.0 – 20.0 NR 99.9	Present weight of child in kilograms as reported by mother	Check against record cards
Q.7	BF	Numeric 1.0 1 – 2 NR 9	Breast-feeding of child 1 – yes 2 – no 9 – no response	
Q.8	NBF	Numeric 1.0 1 – 5 NR 9	Breast-milk alternatives 1 – formula 2 – anchor 3 – condensed milk 4 – other 5 – none	To be answered only if answer to BF is NO
	OBF	Alphanumeric 30	Other milk alternative	To be answered only if answer to NBF is 4 (other)
Q.9	BFP	Numeric 1.0 1 – 2 NR 9	Problems with breast-feeding 1 – yes 2 – no 9 – no response	To be answered by all mothers
Q.10	PROBLEMS1	Alphanumeric 30	Problems with breast-feeding	To be answered only if answer to BFP is YES.
Q.11	HRS	Numeric 2.0 1 – 72, 73 NA 88 NR 99	No. of hours after birth that child was first fed 73 – 73 and above 88 – never breast-fed 99 – no response	Use code 73 for all answers 73 hours and above
Q.12	OM	Numeric 1.0 1 – 2 NR 9	If child receives any food/drink other than breast/ formula/other milk alternatives 1 – yes 2 – no 9 – no response	If no, skip to Q.15
Q13	DOM	Alphanumeric 15	Specific types of drink other than breast/formula/other milk alternatives given to child	To be answered only if answer to OM is YES
Q.13a	ADOM	Numeric 2.0 0 – 96 NR 99	Age of introduction of specific drink mentioned in Q.13	To be answered only if answer to OM is YES. Convert all answers to WEEKS.
Q.13b	RDOM	Alphanumeric 30	Reasons for giving drink mentioned in Q.13	To be answered only if answer to OM is YES
Q.13c	HDOM	Numeric 1.0 1 – 2 NR 9	How foods/drinks mentioned in Q.13 are given to child 1 – bottle 2 – cup and spoon 9 – no response	To be answered only if answer to OM is YES 3 – 8 to be use for coding other means of giving drink to child
Q14	FOM	Alphanumeric 15	Specific type of food other than breast/formula/other milk alternatives given to child	To be answered only if answer to OM is YES
Q.14a	AFOM	Numeric 2.0 0 – 96 NR 99	Age of introduction of specific food mentioned in Q.14	To be answered only if answer to OM is YES. Convert all answers to WEEKS.
Q.14b	RFOM	Alphanumeric 30	Reasons for giving food mentioned in Q.14	To be answered only if answer to OM is YES

Quest. No.	Field Name	Field Type & Valid Codes	Description	Remarks
Q.15	OCB	Numeric 2.0 0 – 14 NA 88 NR 99	Number of other children mother has given birth to	If 0, go to Q.22 Use code 88 (NA) if child not with mother all the time (Grandma or other takes care/feeds child all the time)
Q.16	BF92	Numeric 1.0 1 – 3 NR 9	if child/children born before 1992 was/were breast-fed 1 – yes 2 – no 3 – no child before 1992 9 – no response	
Q.17	BFLC	Numeric 1.0 1 – 2 NR 9	Breast-feeding status of last child 1 – yes 2 – no 9 – no response	Last child means second youngest child. If no, go to Q 22
Q.18	ASF	Numeric 2.0 0 – 240. 888 NR 999	Age of last child when stopped breast-feeding 888 – have not stopped breast-feeding 999 – no response	To be answered only if BFLC is yes. Convert all answers to WEEKS.
Q.19	ADOM2	Numeric 2.0 0 – 240 NR 999	Age of introduction of first drink to last child	Convert all answers to weeks
	DOM2	Alphanumeric 15	Specific drink first given to last child	
Q.19a	AFOM2	Numeric 2.0 0 – 96 NR 99	Age of last child upon introduction of first food.	Convert all answers to WEEKS.
	FOM2	Alphanumeric 15	Specific first food given to last child.	
Q.20	BFP2	Numeric 1 – 2 NR 9	Problems with breast-feeding 1 – yes 2 – no 9 – no response	
Q.21	PROBLEMS2	Alphanumeric 30 NA NONE	Specific problems with breast-feeding previous children	To be answered only if answer to BFP2 is YES.
Q.22	INFO	Alphanumeric 15 NA NONE	Source of information on breast-feeding	

Notes on editing questionnaires

Grandmother	use G/MA
Mother	use MUM
Sweet	use SWT
Breast-milk	use BM

Reasons for giving first food or drink:

RIGHT TIME means mum thought it was time for baby to be given food or drink
RIGHT TIME (NAME) e.g. RIGHT TIME G/MA means grandmother thought it was time for the baby to be given food or drink
NR means the mother did not give any reason

Type of food:

STORE (NAME OF FOOD) e.g. STORE BABY FOOD, or STORE BABY CEREAL means food bought from a shop

Source of information of breast-feeding

NG means none given

The following are the three different types of nurse in Rarotonga:

ANTENATAL CLINIC NURSE or ANC NURSE
HOSPITAL NURSE or HOSP NURSE or HOS N
PHN NURSE or PHN

Number of hours after birth baby was first breast-fed:

If immediately, put 0 hours
If never breast-fed, put 88
If number of hours is 73 and above, put 73 hours

Age of introduction of food or drink

If indicated 0 – 6 days, put 0 weeks

Age stopped breast-feeding last (second youngest) child

If still breast-feeding second youngest child as of interview, use 888

Remember that question 8 asks for MILK SUBSTITUTES.

For older children who may no longer be drinking milk and who are not receiving any milk or milk substitute, put CODE 5 in question 8 (means NONE).

If Grandmother or other relative/caretaker takes care of the present child all the time (present child not with its natural mother all the time), put the not applicable codes (8 or 88) in Questions 2 (is mother working), 3 (is mother working full or part-time) & 15 (no. of other children born); put N/A in Question 22 (source of information).

Counting weeks:

1 month	=	4 weeks
2 months	=	8
3 months	=	13
4	=	17
5	=	21
6	=	26
7	=	30
8	=	34
9	=	39
10	=	43
11	=	47
12	=	52

Name of Clinic	Clinic Code
Akaoa	01
Avana	02
Avatiu	03
Areanu	04
Betela	05
Black Rock	06
Inave 1	07
Kavera	08
KiiKii	09
Maraerenga	10
Matavera	11
Muri	12
Ooa	13
Panama	14
Parekura	15
Pokoinu	16
Pue	17
Ruaau	18
Ruatonga	19
Rutaki	20
Takuvaine Town	21
Tepiri	22
Tepuka	23
Tikioki	24
Titikaveka	25
Tuarai	26
Turoa	27
Tupapa	28
Turangi	29
Tutakimoa	30
Vaimaanga	31
Inave 2	32

Table 1F. Distribution of mothers by number of hours after birth breast-feeding was initiated

Number of hours	N	%
Immediately (0 hours)	86	41.5
Within 1 hour	36	17.4
2 to 6	59	28.5
7 to 12	10	4.8
13 to 24	0	0.0
25 to 48	10	4.8
> 48 hours	1	0.5
Never initiated	5	2.4
Total	207	100.0

n missing = 15

Table 2F. Age in months of penultimate child when mother stopped breast-feeding

Age (months)	N	%	Cum %
< 1	0	0.0	0.0
1 - < 4	30	21.4	21.4
4 - < 6	11	7.9	29.3
6 - < 12	42	30.0	59.3
12 - <24	21	15.0	74.3
24 & up	27	19.3	93.6
have not stopped	9	6.4	100.0
Total	140	100.0	

n missing = 3

Table 3F. First drink other than milk given to penultimate child (n=152)

Drink	N	%
Water (boiled/warm or plain)	31	20.4
Nu	85	55.9
Juice (all kinds)	31	20.4
Glucose/Sugar water	4	2.6
Softdrink	2	1.3
Can't remember/no response	15	9.9
Other	3	2.0

Table 4F. First food other than milk given to penultimate child (n=152)

Food	N	%
Baby food/cereal/rice	50	32.9
Fruit		
Banana	9	5.9
Pawpaw	41	27.0
Mango/Apple	2	1.3
Other	3	2.0
Vegetables		
Taro leaves	17	11.2
Pumpkin	4	2.6
Potato/Kumara	4	2.6
Other	5	3.3
Custard	4	2.6
Yoghurt	3	2.0
Fish	14	9.2
Other meat/egg	2	1.3
Coconut flesh	14	9.2
Other	6	3.9
Cannot remember/no response	12	7.9

Table 5F. Age at introduction of drinks other than milk to penultimate child

Age (months)	N	%	Cum %
< 1	49	37.4	37.4
1 - < 4	42	32.1	69.5
4 - < 6	17	13.0	82.4
6 - < 12	17	13.0	95.4
12 - <24	5	3.8	99.2
24	1	0.8	100.0
Total	131	100.0	

Table 6F. Mean difference in age of infants (months) at introduction of drink and food other than milk to penultimate children compared to survey infants

	N	Mean difference (age in months)	sd	t-statistic (df)	p
Other drink	120	0.7	2.8	2.829 (119)	0.005
Other food	94	0.4	2.1	1.908 (93)	0.060

Table 7F. Age at introduction of food other than milk to penultimate child

Age (months)	N	%	Cum %
< 1	3	2.3	2.3
1 - < 4	44	33.3	35.6
4 - < 6	40	30.3	65.9
6 - < 24	45	34.1	100.0
Total	132	100.0	

Table 8F. Reported problems in breast-feeding previous children (n=34)

Problem	N	%
Nipple problems		
Cracked/sore nipples	8	18.2
"inverted" nipple	2	4.5
nipple too big for baby	1	2.3
Breast problems		
Mastitis/Abscess/Boil on breast	3	6.8
sore breast	2	4.5
engorgement of breast	2	4.5
breast too small	1	2.3
Not enough breastmilk/milk not flowing	7	15.9
Baby likes only one breast/refused breast	3	6.8
Did not know how	1	2.3
Other	4	9.1
No response	1	2.3