

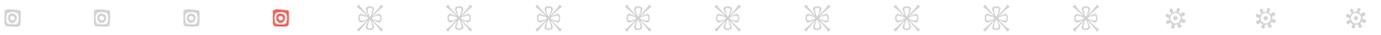


Chapter 4

Infant and young child complementary feeding among Indigenous Peoples

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“In the Awajún culture a child who goes to the *chacra* [field] with the mother, often has a full belly by the time she comes home.”

Awajún elder

Abstract

This chapter examines infant feeding practices among nine of the 12 case studies that formed the Indigenous Peoples' Food Systems for Health Program of the Centre for Indigenous Peoples' Nutrition and Environment (CINE). Information was obtained from key informant interviews, case study reports and published literature. Traditional food practices in these indigenous communities are being altered as a result of environmental and land tenure changes and the influence of outside markets; these changes affect infant feeding practices. Local indigenous fruits, vegetables and animal-source foods can provide macro- and micronutrient-rich options for complementary feeding that may be less expensive and more nutritious than market foods. In all of these communities, there is need for consistent practical nutrition advice to promote exclusive breastfeeding for infants up to six months of age, and the timely introduction of complementary foods thereafter. Nutrition education interventions can help families provide optimal nutrition for their infants by integrating traditional food practices with the wise use of local market foods.

Introduction

The first two years of life involve rapid physical, cognitive and social development that require optimal nutrition. Adequate infant and young child (IYC) feeding practices are needed to support this development and provide protection from the risk of morbidity and mortality in low-resource environments. To achieve this, international IYC feeding recommendations include exclusive breastfeeding until six months of age, after which adequate complementary foods should be added; breastfeeding is recommended to continue for two years or beyond (PAHO and WHO, 2003). Complementary

feeding is challenging because it requires selection of foods that are easy to prepare and commonly used in family meals; provide sufficient energy and nutrients for a growing child; are not contaminated; and are accessible, affordable, locally available and culturally acceptable (WHO, 1998). The international recommendations for complementary feeding of breastfed children give clear guidelines for timely, adequate, safe and appropriately fed complementary foods (PAHO and WHO, 2003). However, these recommendations have not been universally adopted by all countries, nor are they well adapted to many local situations. Traditional values and practices regarding food, food preparation and eating are key components of cultures and group identity and affect how infants and young children are fed. In many parts of the world, traditional indigenous food practices are being altered as a result of environmental changes and the influence of outside markets (Kuhnlein and Receveur, 1996). Factors that change access to and preparation and use of traditional foods also have an impact on IYC feeding practices.

It is generally accepted that breastmilk should be an infant's first food. At about six months of age, there is a gap between an infant's nutritional requirements and the energy and nutrients that can be obtained from breastmilk alone, and additional foods must be added to the diet (WHO, 1998). To develop nutrition messages for complementary feeding that are both nutritionally and culturally appropriate for a specific Indigenous People, there is need to understand traditional foods, their uses and the existing complementary feeding practices. While the nutritional

values of many traditional foods (FAO, 2009) have been determined, there is little information on actual IYC feeding practices in indigenous communities. What are the first foods introduced to infants, and at what age are they given? With what frequency are infants fed complementary foods, and how are they fed? Does the feeding behaviour for complementary foods influence breastfeeding patterns? What combinations of foods are given, and are these combinations advantageous for nutrient absorption (Gibson, Ferguson and Lehrfeld, 1998)? Are traditional food processing methods such as fermentation that improve food safety and nutrient availability used at the household-level (Kimmons *et al.*, 1999)? Are there IYC feeding practices such as pre-mastication that expand access to nutrient-rich foods (Pelto, Zhang and Habicht, 2010)? Are there health concerns about these practices (Gaur *et al.*, 2009)? What changes have occurred in IYC feeding, and how can these be expected to affect IYC nutrition and health today?

In response to the pressure of the modern market and the loss of hunting and gathering opportunities, many IYC feeding practices among indigenous communities are expected to have changed. Indicators for complementary feeding are important for assessing current practices, to help determine which traditional and present-day practices may or may not be

advantageous for children's well-being, to screen and target vulnerable populations, and to monitor and evaluate interventions (Ruel, Brown and Caulfield, 2003). Recently published indicators (Table 4.1) capture the adequacy of complementary feeding practices and include continued breastfeeding, age of introduction of complementary foods, minimal dietary diversity, minimal meal frequency, consumption of iron-rich foods, and a composite indicator for a minimum acceptable diet (WHO and Lippwe, n.d.).

This chapter examines examples of Indigenous Peoples' IYC feeding practices today and, where possible, discusses changes in feeding behaviours that have occurred in the recent past. Information on indigenous communities was obtained from key informant interviews and direct observations previously collected for nine of the 12 case studies that formed CINE's Indigenous Peoples' Food Systems for Health Program: Awajún (Peru), Baffin Inuit (Canada), Dalit (India), Gwich'in (Canada), Igbo (Nigeria), Ingano (Colombia), Karen (Thailand), Nuxalk (Canada) and Pohnpei (Federated States of Micronesia) (FAO, 2009). The Igbo research team conducted additional interviews in 2008 with seven female Igbo elders aged between 65 and 80 years. Child feeding data from the 2004 baseline questionnaire for the Awajún are also included. Additional information about feeding practices in the

Table 4.1 Indicators for the feeding of infants and young children

<i>Indicator</i>	<i>Definition</i>
Early initiation of breastfeeding	Proportion of children born in the last 24 months breastfed within one hour of birth
Exclusive breastfeeding up to 6 months	Proportion of infants 0–6 months fed exclusively with breastmilk
Continued breastfeeding at 1 year	Proportion of children 12–16 months fed breastmilk
Introduction of solid, semi-solid or soft foods	Proportion of infants 6–9 months receiving solid, semi-solid or soft foods
Minimum dietary diversity	Proportion of children 6–24 months receiving foods from 4 or more food groups
Minimum meal frequency	Proportion of breastfed and non-breastfed children 6–24 months receiving solid, semi-solid or soft foods (including milk feeds for non-breastfed children) at least the minimum recommended number of times
Minimum acceptable diet	Proportion of children 6–24 months receiving a minimum acceptable diet (excluding contribution of breastmilk)
Consumption of iron-rich or iron-fortified foods	Proportion of children 6–24 months receiving iron-rich or iron-fortified food that is specially designed for infants and young children, or that is fortified in the home

Source: WHO, 2008.



indigenous communities was obtained either from published literature and interviews with case study partners, or from previous CINE case study reports for the region. It is hoped that this accumulated, albeit limited, knowledge can guide health promotion projects for encouraging the inclusion of appropriate traditional foods and cultural practices that will assist indigenous families in achieving optimal nutrition for their infants and young children.

Asia and the Pacific

Pohnpei – Pingelapese people of the Federated States of Micronesia

Timing of complementary feeding

Early introduction of complementary foods was reported by Englberger, Marks and Fitzgerald (2003). In the 1980s, 48 percent of Pohnpei infants were given solid foods by four months of age. In 2008, mothers based the timing of solid food introduction on advice from Pohnpei public health staff (Englberger *et al.*, 2009). Most mothers gave birth at the local hospital, where they were advised to breastfeed exclusively for the first six months before introducing complementary foods. The definition of exclusive breastfeeding includes the provision of oral rehydration salts and drops but not the introduction of *both* non-breast milk liquids and complementary foods. However, from the reports of public health staff, it appears that the exclusive breastfeeding message has been misinterpreted to mean only that no complementary foods should be offered in the first six months. Of the ten infants in the survey, four were younger than six months and had not been introduced to foods. Of the six who were older, four had been introduced to foods at six months, one before six months, and one at seven months. However, other liquids were given before the infants were six months old. One care giver reported that health staff had told her that it was all right to give water and coconut (*Cocos nucifera*) juice to her infant before six months. Coconut water was given most frequently, to seven out of ten infants, while water was given to five out of ten.

Complementary foods

The five most common foods given to infants in the 1960s were breadfruit (*Artocarpus altilis/mariannensis*), *Karat* (*Musa troglodytarum*, a vitamin A-rich banana cultivar), coconut embryo, other ripe bananas (*Musa* spp.) and ripe papaya (*Carica papaya*) (Englberger *et al.*, 2009). Englberger, Marks and Fitzgerald (2003) reported that in the 1980s, care givers did not believe that food had positive health qualities and so they did not encourage children to eat. Pohnpei mothers refrained from giving meat and fish until their infants were one year old, because they did not want the children to get used to meat and fish and then be sad when they were not available. Mothers also believed that these foods would cause diarrhoea. Late introduction of fish at about one year of age had already been reported by Marshall and Marshall (1980) in a study of 49 Peniyesene infants. In this 1974 to 1976 study, the first complementary foods included mashed banana, papaya and mango (*Mangifera indica*). Soft boiled rice and/or mashed cooked breadfruit were then introduced, along with taro, soft bread, flour soup, mashed sweet potato (*Ipomea batatas*) and coconut sauce.

Changes in feeding practices over the past 50 years were documented by Englberger *et al.* (2009). According to the Mand Community Working Group in Pohnpei, the most popular complementary foods given to infants in 2005 were ripe banana, giant swamp taro (*Cyrtosperma chamissonis*), coconut embryo, imported baby food and ripe papaya. Giant swamp taro and imported baby food were far more commonly used than they were in the 1960s. Additional imported foods that are now more frequently given to infants include bread, flour cooked in water, rice soup, doughnuts, ramen and biscuits. Among the six infants given solid foods, three were first introduced to grated boiled green banana, two to ripe *Karat* and one to imported cereal. Traditional rich sources of iron and zinc were not reported.

Dalit – scheduled caste of India

The Dalit farmers from Medak District of Andhra Pradesh in southern India were studied by Schmid

et al. (2006; 2007). Most of the Dalit families were illiterate, had no land and worked as farm labour. The prevalence of mild to severe underweight (< -2 SD weight-for-age) was 63 percent for children aged six to 39 months among the *sanghams* (Dalit volunteer women's groups) (Salomeyesudas and Satheesh, 2009). A high prevalence of iron deficiency has also been found among children aged 12 to 23 months in the area (Schmid *et al.*, 2006).

Timing of complementary feeding

In 2003, a study on improving access to traditional Dalit foods reported feeding practices for infants (six to 11 months) and young children (12 to 39 months) (Schmid *et al.*, 2007). Season appeared to affect child feeding patterns: exclusive breastfeeding was more common in the summer season, and fewer children were fed complementary foods or weaned in the summer than the rainy season. Among the non-intervention children in the study, rainy season intakes were higher in energy, protein and iron than summer season intakes ($p < 0.01$).

Complementary foods

The main non-breastmilk food source for non-intervention infants in the Schmid *et al.* (2007) study was rice (*Oryza sativa*), contributing about one-third of energy and about 28 percent of protein from complementary foods. During the rainy season, sorghum (*Sorghum vulgare*) provided about one-third of iron (34 percent). Animal-source foods contributed only 4 percent of iron intake and 11 percent of vitamin A. In the summer season, fruits contributed about 24 percent of vitamin A. Some women working on farms gathered traditional leafy green plants and included these in the family diet. Overall, energy, protein, vitamin A and iron intakes were found to be below recommendations for young children.

Karen – Indigenous People of Thailand

The prevalence of stunting among the hill tribe Karen children was twice that of the general Thai population,

at 25 versus 12 percent (Panpanich, Vitsupakorn and Chareonporn, 2000). Among the 24 infants who were part of the case study in 2005, there was no incidence of underweight before seven months of age (Chotiboriboon *et al.*, 2009). Prevalence of inadequate weight gain increased with age, with 36 percent of young children being underweight by the second year of life. One-quarter of the infants younger than 12 months were stunted. Studies in older children suggest that nutritional problems intensify after one year of age. A recent survey in northern Thailand found very high rates of malnutrition among northern Karen children aged one to six years: 85.5 percent underweight, 73 percent stunting, and 48.4 percent wasting (Tienboon and Wangpakapattanawong, 2007).

Timing of complementary feeding

The case study data suggested that the Karen in Kanchanaburi Province usually breastfed exclusively until their infants were approximately three months old, when complementary foods were introduced (Chotiboriboon *et al.*, 2009). For some infants, however, complementary feeding was introduced later than the suggested six months of age.

Complementary foods

The case study also found that the Karen often fed a watery broth made by boiling vegetables mixed with rice (*Oryza sativa*) as a first food (Chotiboriboon *et al.*, 2009). Some mothers gave mashed rice with banana (*Musa sapientum*) or salt or clear soup as initial complementary foods. Ripe papaya (*Carica papaya*) or mangoes (*Mangifera indica*) might also be given to infants. Several leafy greens, vegetables and fish were also part of infant feeding. Most of the protein for infants came from breastmilk.

Poor-quality complementary foods led to an inadequate energy intake among infants aged six to 11 months, meeting only 58 percent of the Thai energy recommendations. Given the low micronutrient value of the foods, breastmilk continued to be an important source of nutrients for infants, particularly of vitamin A, for which breastmilk provided the total requirement.



Africa

Igbo – Indigenous People of Nigeria

The Igbo are located in the southeastern region of Nigeria. In the past, a new mother would learn about infant feeding from the experiences of her own mother, who would stay with her for one to three months after the infant's birth (Okeahialam, 1986). Among the Igbo living in urban areas, this tradition is disappearing. Today, urban mothers are less likely to receive this outside help because they often live and work away from their families and their own mothers are also more likely to be working. In the case study, seven Igbo elders described the infant feeding practices when they were children. One elder said that water was given immediately after birth, and breastmilk was first introduced a couple of days later, when the breast had been treated and washed. Today, although breastfeeding rates are still quite high, the Igbo introduce other liquids very early. In a study in a rural area of Igbo-Ora Nigeria, all of the 411 infants received water in the first week (Nwankwo and Brieger, 2002). Health care workers advised 97 percent of the women to give glucose-water shortly after birth, and 72 percent complied during the first week. Nearly half of the infants were given herbal teas in the first week, and 97 percent had received herbal supplements by four months of age. Mothers reported introducing liquids because of health care staff recommendations or beliefs about the inadequacy of breastmilk for their children's nutrition, or because exclusive breastfeeding would be too physically draining on their own health, owing to their inadequate diets.

Okeke *et al.* (2009) cited malnutrition prevalence data from the 2003 Nigeria Demographic and Health Survey for the Igbo Region (southeast Nigeria): 20 percent of children were stunted, 5 percent were wasted and 8.5 percent were underweight. They also cited data from the National Micronutrient Survey showing that 15 percent of children in this area were vitamin-A-deficient.

Timing of complementary feeding

In a 1970s study, Kazimi and Kazimi (1979) reported that 85 percent of mothers introduced complementary

foods at between three and seven months of age. Igbo elders asked about complementary feeding when they had young children responded that it was initiated at between three and ten months (although one elder mentioned one week), reflecting variations in practice and the difficulty in recalling the past. Elders reported that infants are now given complementary foods by five to six months of age, but it was documented that infants younger than four months were sometimes introduced to food (Okeke *et al.*, 2009).

Complementary foods

Igbo elders reported that popular foods given in the past after the initiation of complementary feeding included roasted cocoyam (*Colocasia* spp.), cassava (*Manihot esculenta*), millet (*Pennisetum* spp.), cassava paste, cassava soup, maize (*Zea mays*) and beans, all of which are traditional Igbo foods. Elders reported that yam (*Dioscorea* spp.) and some edible insects were roasted or boiled to supplement infants' diets. Cocoyam was typically roasted and mixed with oil, while cassava flour was mixed with hot water and stirred to thicken into a soup. Elders considered these foods good for growth, easing hunger, health and satisfying the infant.

The primary animal-source foods given to infants under one year of age included chicken (*Gallus gallus*), chicken liver and edible insects such as crickets. Most elders said that animal-source foods were introduced at five months. Vegetables were most commonly introduced between three and six months, and included amaranthus (*Amaranthus* spp.) and eggplant (*Solanum macrocarpum*) leaves. Oranges (*Citrus* spp.) and apples were the most common fruits given. Other fruits were bananas (*Musa sapientum*), pears (*Canarium schweinfurthii*) and mango (*Magnifera indica*). These were said to be given at any time between two and ten months of age.

When the elders had their own children, additional complementary foods were introduced between three and eight months to ensure the child's health and growth. These included akamu (a semi-liquid porridge made from maize grains soaked for two to three days), rice (*Oryza sativa*), beans and Cerelac (a commercially processed cereal made from maize and milk). These new foods were introduced when there was exposure to them

through the market, education about them, or an increase in household income making them affordable.

The elders from the case study unanimously reported a reduction in the traditional foods that are given to their grandchildren. Reasons for this reduction relate to: i) cultural beliefs about the foods themselves – “Giving traditional food will make the baby behave foolishly when grown”; ii) food preparation challenges – “Because of a time factor”; and iii) undesirable feeding practices associated with traditional foods – “Overfeeding will cause the child to be ‘dull’”. Negative perceptions or stigma relating to traditional foods and practices may have emerged recently as families move away from their communities.

According to previous work in the Igbo case study, the complementary foods used today are usually the same as those eaten by the rest of the family, with the addition of maize gruel. Foods that are considered to be healthy for infants are *akara* (bean balls), *ukwa* (*Artocarpus communis*, African breadfruit), *ukpo oka* (plantain pudding), African yam bean (*Sphenostylis stenocarpa*), plantain stew, boiled plantain, and *ujuju* (*Myrianthus arboreus*, a type of fruit) soup (Okeke *et al.*, 2009). In their questionnaire responses, the elders of the Igbo community reported new complementary foods as being milk (powdered, soy and liquid whole bovine) and commercial products, including Bournvita and Milo (chocolate energy drinks), Cerelac and Nan (an infant formula). The availability and use of traditional foods decreased as people had less access to land, new foods became available on the market, and families’ income, exposure to external cultures and education increased.

North America

Baffin Inuit – Indigenous People of Canada

A study in Nunavut found that Inuit breastfed for a median duration of eight months (Schaefer and Spady, 1982). Key informant interviews with case study community partners found that the first foods introduced to infants were often meats, including seal meat, a rich source of iron.

Gwich’in Nation – Indigenous People of Canada

For the Gwich’in, the first complementary foods were animal-source foods such as pre-masticated meat, fish broth and fish table food (Kuhnlein *et al.*, 2009). A key food for the Gwich’in is caribou (*Rangifer tarandus granti*), an iron-rich wild meat. Leaders from the Gwich’in case study expressed concern about the migration of caribou due to unpredictable climate change, which will affect access to and availability of this meat in the future.

Nuxalk Nation – Indigenous People of Canada

The Nuxalk placed importance on infant feeding, with key foods including the highly valued ooligan (*Thaleichthys pacificus*), which has disappeared owing to offshore fish farming, among other reasons. Key informant elders mentioned the importance of wild berries and other fish, including salmon (*Oncorhynchus* spp.), for the diets of young children.

South America

Ingano – Indigenous People of Colombia

Although Colombia has made substantial progress in improving the nutrition status of its population, malnutrition remains a problem in some regions. Correal *et al.* (2009) reported a substantial prevalence of stunting among Ingano preschool-aged children (three to six years old), with 22 percent stunted, 19 percent underweight, and 2 percent wasted. Reflecting the nutritional transition in Colombia, 4 percent of preschoolers were obese.

Timing of complementary feeding

Among the Ingano, breastfeeding is the norm, but complementary feeding starts early, sometimes as early as one month after birth, and almost all the infants were given complementary foods by their fourth month

(Correal *et al.*, 2009). Field personnel working with the Ingano were interviewed as key informants. There was some variation in the age at which foods were first introduced, but early introduction appeared to be the norm. The key informants reported that fruits were introduced from two months, fish and banana soups as early as three months, and complementary foods in general by five months.

Complementary foods

Approximately 58 percent of children’s diets were traditional Ingano foods (Correal *et al.*, 2009). Key informants also reported that much of the infant diet comes from traditional foods. The main fruits given were banana, *milpes* (*Oenocarpus bataua*, a fruit and palm tree), palm heart and papaya (*Carica papaya*). After five months of age, *cucha* (fish soup), chicken soup, *rallana* (banana and manioc soup), vegetables (such as squash, tomatoes, onions), cimarron or coriander leaves (*Eryngium foetidum*), *anduche* (banana drink), *arepas* (flour and maize mixture) and eggs were commonly given. Fish, chicken and meat from the forest were usually given next. *Mojojoy* (*Rynchophorus palmarum*, a nutritional and medicinal beetle larva) were added to the diet in late infancy. Field personnel reported that foods for Ingano infants were chosen for many different reasons (Table 4.2).

Table 4.2 Ingano complementary foods and value of food reported by staff key informants

Complementary food	Local importance of food
<i>Cucha</i> (fish soup)	Important for growth and to avoid malnutrition
Cimarron or coriander leaves (<i>Eryngium foetidum</i>)	To improve flavour and as a remedy for hepatitis B and anaemia
Banana (<i>Musa sapientum</i>)	For infants’ growth
<i>Milpes</i> (<i>Oenocarpus bataua</i>)	As a remedy for coughs
<i>Chontaduro</i> (<i>Guilielma gasipaes</i> , a wild palm fruit), all fruits	Infants like them
<i>Mojojoy</i> (<i>Rynchophorus palmarum</i>)	For children with respiratory problems

The same local research team reported that the frequency of feeding for most Ingano traditional foods had not changed substantially from the past. The use of smaller quantities of some traditional foods, such as pheasant, can be attributed to communities no longer harvesting or hunting these foods. New complementary foods include powdered milk, rice, eggs and meat bought at local markets, lentils, beans, white sugar, pasta and snacks.

Awajún – Indigenous People of Peru

A recent study documented a high prevalence of stunting in the Awajún community, reaching 49 percent among children aged three to five years, 26 percent of whom were severely stunted (Roche *et al.*, 2007). Overall, 39 percent of the Awajún children up to five years of age were found to be stunted. Among children younger than two years, 44 percent were stunted, with a mean Z-score of -1.9 ± 1.0 height-for-age (Creed-Kanashiro *et al.*, 2009). Stunting is linked in part to inadequate early feeding.

Timing of complementary feeding

Information on the dietary intake of infants and young children aged 0 to 23 months was collected through interviews with 32 mothers in six Awajún communities in the northern Amazon rain forest (Roche *et al.*, 2010). More than half of the mothers exclusively breastfed their infants for the first six months. Among the remaining 48 percent of infants, complementary foods were introduced as early as two months of age.

Complementary foods

Liquids other than breastmilk were given soon after birth (Creed-Kanashiro *et al.*, 2009). A lightly fermented pre-masticated cassava beverage, *masato*, and *chapo* (roasted ripe banana drink) were the most common beverages given. Other milks (canned evaporated bovine milk) were given to 39 percent of infants, but usually after eight months and while still breastfeeding.

Key informants interviewed in the Awajún community in 2004 mentioned that *aves del monte* (wild birds), *majas* (small wild animal, *Cuniculus paca*),

small fish from forest streams, *patarashka* (fish, including the organs and viscera, tomatoes, onion and sweet chilli baked in green leaves) were common complementary foods, but have become harder to obtain. Access to traditional and local foods such as these has been reduced as a result of increases in population and decreases in land availability. Encroachment on land and overhunting have reduced wild animal populations and increased the time and distance required for hunting. One Awajún key informant reported that the population had access to less biodiversity than before, so some foods were no longer available.

Among the first complementary foods now given to the Awajún are boiled foods (mainly banana), tubers and roots – cassava (*Manihot esculenta*), *sachapapa* (*Dioscorea* sp., a variety of potato) and turnip (Creed-Kanashiro *et al.*, 2009). Soups with added chicken or egg are also quite common. A key informant interview in the communities provided additional information about popular complementary foods: *chapo* (roasted ripe banana drink), ripe banana and *suri* (*Coleopterus* sp., beetle larva). Soon after these had been introduced, infants could be given almost anything else, including *chonta* (palm heart), eggs and *masato*. Tougher wild meats were not given to babies. Another key informant provided different information, reporting that fruits and vegetables were not given to infants younger than eight months because they are believed to cause diarrhoea and make children ill. Fruits were also not thought to have vitamins, so they were not considered important food for children, regardless of whether or not a child liked eating them. However, *chonta* was given to make children grow. This informant also mentioned that *perdiz del monte* (partridge) (*Tinamus tao* and *Steatornis caripensis*) was a common food given to infants. Other common foods for infants are fish, various animals and *paloma del monte* (*Columba subvinacea*, pigeon). When an infant is ill, *suri* is given.

Roche *et al.* (2010) used an infant feeding history questionnaire to document complementary foods that were commonly introduced. The most popular first foods mentioned were cassava and *chapo*. Following these, banana, palm heart, fish and egg were introduced.

For daily consumption, cassava, banana, *chapo*, *aguaje* (*Mauritia peruviana*, palm tree fruit) and seasonal fruits were the foods most often given. Fish, eggs and other animal-source foods were usually given not more than once a week. *Eep* (leafy greens) were usually given once a week. Infants aged six to 11 months were fed complementary foods an average of 0.9 to 1.6 times a day, which is less than the recommended minimum meal frequency, whereas children aged 12 to 23 months old were fed an average of seven times a day. Most Awajún infants were breastfed, making breastmilk a major source of dietary energy (not quantified).

Between six and 24 months of age, most (92 percent) of the energy intake from complementary foods was provided by local Awajún foods such as banana, cassava, *sachapapa* and *pituka* (*Colocasia esculenta*) (Creed-Kanashiro *et al.*, 2009). The remaining 8 percent was purchased or obtained from donations, including milk and rice. The median iron intake (4.9 mg/day) of infants and young children aged six to 24 months was about half the recommendation (7 to 11 mg/day).

Conclusions

The complementary feeding practices of Indigenous Peoples included in the nine case studies provided a spectrum of different geographical and cultural characteristics. However, the available data are limited, and provide only rough estimates of feeding practices. The overall picture to emerge from interviews and a review of statistics on IYC nutrition status at these locations suggests that there is wide variation in complementary infant feeding patterns among indigenous communities, and that these practices generally need to be improved to provide optimal nutrition.

Literature on other indigenous populations that were not included in the case studies concurs with these findings, with examples of both early and late introductions of foods. Early introduction of complementary foods was reported among Canadian First Nations in a study of 102 infants on Walpole Island (Kuperberg and Evers, 2006), where 19 percent of infants received solid foods before they were two

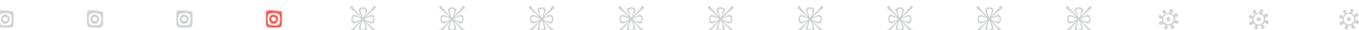


Table 4.3 Complementary feeding practices among Indigenous Peoples

Country	Age for CF introduction ¹ in country (months)	Indigenous culture	Age for CF introduction in indigenous community (months)	Examples of nutrient-rich traditional foods excellent for CF	Practices that could be improved for better infant nutrition
Africa					
Nigeria	3.6	Igbo	5.5	Chicken liver, insects, cocoyam, yam bean	Exclusive breastfeeding for 6 months Use only market foods that are healthy choices
Asia and the Pacific					
Federated States of Micronesia	< 6	Pohnpei	6	Karat, mango, papaya	Exclusive breastfeeding for 6 months Use fish as CF
India	6–9	Bhil	10.5	NA	Introduce CF at 6 months
		Dalit	> 9	Wild dark leafy greens, sorghum, pulses	Feed enhancers of iron absorption (e.g., citrus fruit)
Thailand	2–4	Karen	3	Fish, papaya, mango, leafy greens	Exclusive breastfeeding for 6 months
North America					
Canada		First Nations		NA	Exclusive breastfeeding for 6 months
		Baffin Inuit		Seal meat	Continue breastfeeding after 6 months
		Gwich'in		Caribou meat, fish	
		Nuxalk		Salmon, wild berries	
South America					
Colombia	> 4	Ingano	5	Wild plants, insects, meats	Exclusive breastfeeding for 6 months Use only market foods that are healthy choices
Peru	3–4	Awajún	2–6	Local leafy greens (<i>eep</i>) and fruits (mango, <i>aguaje</i> and papaya), fish, <i>suri</i>	Exclusive breastfeeding for 6 months More frequent feeding of infants

NA = information not available.

CF = complementary food.

¹ The average age (months) for introducing complementary foods was obtained from the most recent individual country surveys available through the Demographic and Health Survey Statcompiler program, at www.statcompiler.com.

months of age and 57 percent before four months of age. The food most commonly introduced first was infant cereal, followed by pureed fruit. Infants were given cow milk at between six and 15 months of age, and more than half of the children had been given low-fat milk before two years of age (Kuperberg and Evers, 2006). In contrast, late introduction of complementary foods was common among the Bhils, the primary scheduled tribe in Jhabua District, India, where 1 percent of infants first received complementary foods at between four and six months of age, 18 percent at between seven and eight months, 37 percent at

nine to 12 months, and 40 percent after 12 months (Taneja and Gupta, 1998). This was not a new infant feeding practice among these people; references from 1943 to 1954 described the introduction of solids at ten to 11 months among Bhil infants (Sellen, 2001). The consequences of this practice can be seen in the extremely poor nutrition status of the children: 25 percent wasted, 60 percent stunted, and 84 percent with anaemia (Sharma, 2007).

Table 4.3 shows the age of introduction of complementary foods at each of the indigenous sites surveyed, the comparative national rates in the

respective countries, examples of nutritionally valuable indigenous foods that are available, and traditional practices that could be strengthened to improve infant nutrition status and health. Indigenous foods that are hunted, fished or gathered and provide a rich source of highly bioavailable iron and zinc or fat, for example, are important resources that can be prepared for infants and young children and should be preserved. Universally, there is a need for consistent practical nutrition advice (in communities as well as health care facilities) on IYC feeding. The promotion of exclusive breastfeeding during early infancy, with introduction of complementary foods starting at about six months of age is needed at all sites.

Historical information collected from diverse sources suggests that indigenous complementary feeding practices have changed over the years. To varying degrees, communities have incorporated market foods into their complementary feeding practices; such substitutes may be expensive and less nutritious than the local foods they are replacing. These changes have occurred because of necessity (e.g., to replace foods that have become unavailable with the loss of hunting grounds), but probably also because of individual

choice (e.g., ease of preparation for market foods such as noodles or rice) and an absence of information about the nutritional and health values of local and market foods. Local indigenous fruits, vegetables and animal-source foods that provide macro- and micronutrient-rich options for complementary feeding exist and should be promoted. Nutrition education programmes can help families make informed decisions that will result in optimal nutrition for infants and young children, the preservation of appropriate traditional dietary practices, and wise use of local markets

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