

Infant Feeding in Sāmoa: Knowledge, Attitudes and Practices.

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Abstract

Sāmoa has a double burden of malnutrition; obesity associated with the prevalence of non-communicable diseases, and continuing cases of underweight children presenting at hospitals and health centres. A knowledge, attitude and practice survey of mothers/caregivers of young children in eight villages in four representative regions of Sāmoa was completed in November 2015. The objective of the research was to learn whether international (WHO, UNICEF) and government recommended feeding practices were promoted by district health workers and understood and practiced by mothers or caregivers of children under five years of age. The survey found that while key messages on infant feeding are generally well understood by nurses in the district health centres serving these villages, the knowledge and practices of mothers and other infant caregivers appears somewhat deficient. Most of them understood the importance of breast feeding but only 56 percent of mothers and caretakers know that complementary foods should be introduced, as recommended, at six months of age; 28 percent of the caretakers thought that during the weaning period, solid food given once a day was sufficient, and that only small minority took their infants to health centres for growth monitoring. These findings suggest that there is a case for the reintroduction of monthly village-based maternal and child health clinics in cooperation with village women's committees.

Keywords: Child healthcare, infant feeding practices, malnutrition, breast feeding

Introduction

Malnutrition in the form of obesity, and its relationship to the prevalence of non-communicable diseases has been the major concern about nutrition and health in Sāmoa. However since 1969 malnutrition in the form of under-nutrition has been identified as a health problem among Sāmoan children. Over the years, a steady stream of underweight and malnourished children has been admitted to the paediatric wards. An audit of malnutrition cases admitted in the years 2006–2010 to the national hospital in Apia reported that 182 malnourished children had been admitted. Almost all of the cases were aged less than two years, with the majority being at weaning ages of 12–18 months. The factors contributing to these cases were considered not only to be the result of inadequate infant feeding practices but also poor quality water and sanitation leading to diarrhoea, which can underlie infant malnutrition if inadequately treated (Litara 2011). Government policy on the practice of child feeding to be recommended to mothers or other caregivers is based on WHO and UNICEF standards and health workers are trained to give advice based on these. While there is some evidence about the prevalence of child malnutrition, which we document in this article, there has been limited research on the extent to which key recommendations are understood and practiced by health workers and mothers or other care-givers. This article presents the findings of research by the Centre for Sāmoan Studies at the National University of Sāmoa to examine this question using a knowledge, attitude and practice (KAP) methodology.

Data on the Nutritional Status of Children in Sāmoa

The report of a study a research paper published in 1996 by Berces, Qusted and Adams (cited in Adams and Sio 1997) found from 1992–1994, that 49 children were so severely malnourished they were admitted to the paediatric ward.

Table 1: Number of Malnourished and Underweight Children, 1997, Sāmoa.

Year	Urban Upolu	Rural Upolu	Savaii
1992	97	67	64
1993	48	39	25
1994	49	28	6
1995	39	18	13
1996	30	19	2
Total	260	171	110

Source: Adams, J. and Sio, B. (1997). Research on Existing Situation of Malnutrition in Sāmoa, FAO, UNDP, UNESCO, UNICEF, Rome, Italy.

The study suggested policy options to Government for finalising the National Plan of Action for Nutrition which was being developed at that time. Based on these recommendations a Sāmoa National Nutrition Survey (SNSS) was undertaken in 1999. This found that the most common reason for not breastfeeding given by mothers of malnourished children (both urban and rural) was their belief that they had no (or insufficient) milk. There have been no further surveys since then.

Twenty years later, according to the data from the 2014 Demographic Health Survey in Sāmoa (DHS), malnutrition is still a recognized problem among the under-five population. This data shows no decrease in prevalence since the last nutrition survey in 1996. In 2013, Sāmoa saw 72 hospital admissions for acute, severe malnutrition. Of these cases, two children died. These results suggest that significant undernourishment and perhaps micronutrient deficiencies co-exist in Sāmoa along with high rates of excessive macronutrient and sodium intake.

Under-nutrition in young children was apparently more common up until the 1970s and 1980s, but this declined as Sāmoa became more prosperous. By 2000, the number of children requiring treatment for malnutrition had dropped and attendance at the outpatient malnutrition clinic run by the hospital's Nutrition Centre was so low that the clinic was discontinued. However, in recent years there have been increased child hospital admissions for acute malnutrition, with some deaths. These cases are associated with early cessation of breastfeeding, use of inappropriate breast milk substitutes combined with sweetened tea, the use of baby feeding bottles and nutritionally poor solid foods, however more research is needed to clearly define the practices or barriers causing child malnutrition. While numbers of admissions are relatively small (68 children under 2 years in 2013) these cases indicate that child health outreach services may not be reaching vulnerable population groups. About 5,700 babies are born in Sāmoa each year with most babies (78 percent) born in hospital, while only about 18 percent are home births. Of those with evidence of birth weight,

10.2 percent are low birth weight with higher rates of low birth weight (20 percent) among babies born in Savaii.

Research has found a direct association between a lack of breastfeeding and malnutrition. WHO and UNICEF, recognising that exclusive breastfeeding for the first six months can decrease infant mortality by 19 percent and prevent malnutrition, especially in low and middle income countries like Sāmoa. These agencies recommend exclusive breastfeeding for the first six month of age, the addition of complementary feeds at six months, and continued breastfeeding until two years. They also recommend the early initiation of breastfeeding with one hour of birth.

Adams and Sio (1996) identified the following six important risk factors for infant malnutrition in Sāmoa; low birth weight, infection (particularly diarrheal and respiratory tract infection), lack of breastfeeding, informal adoption, living in rural Upolu, overcrowding in the homes, and lack of birth spacing. At least two or more of these factors were identified in all the studies so far carried out on infant malnutrition in Sāmoa. A report by the Ministry of Health (2014) connected poor dietary practices, artificial feeding with packaged UHT cow's milk instead of baby formula, as well as other poor nutritional practices. It refers to a study in the town of Apia that found 17 percent of bottle-fed infants were malnourished, compared to only five percent of breast fed infants.

The DHS also provides data to understand the context of infant and young child feeding practices in Sāmoa, including data about breastfeeding rates, initiation and duration of breastfeeding, introduction of complementary feeding. In addition to possible social problems influencing feeding practices, and the prevalence of gastrointestinal morbidity among young children, data presented in the DHS 2014 states that inadequate intakes of micronutrients such as Vitamin A and iron are moderate risk factors for the health of mothers and young children. The incidence of anaemia is of public health significance; with children 0–2 years and pregnant women reported as the most vulnerable groups. Of the malnutrition cases reported in 2006–2010, 51 percent were reported to have anaemia. In addition to the risk of anaemia, children under the age of two remain at risk with infant feeding practices continuing to be a challenge especially in rural areas. This suggests that dietary change may be a further issue in child malnutrition.

The 2014 DHS found that four percent of children in Sāmoa under five are moderately or severely wasted. In well-nourished populations it would be expected that only 2.3 percent of children would fall below minus 2 standard deviation; therefore even a “low” level of less than five percent wasting may cause for concern in Sāmoa. The most affected age group in Sāmoa is 0-6 months, with nine percent of children moderately wasted and three percent severely wasted. The next age group (6–8 months) is also significantly affected with five percent of children moderately wasted and two percent severely wasted. Children with moderate and severe wasting are more likely to live in a rural area, in particular North West Upolu and Rest of Upolu and come

from families in the lowest and second wealth quintiles. Moderate and severe stunting is found to be present in five percent of children aged less than five years of age. Although some stunting is present in very young children, moderate and severe stunting increases substantially in the 9–47 month age range in Sāmoa. Severe stunting is present in three percent of children aged 18–23 months. A correlation was found between stunted children, underweight mothers and very small and small size infants at birth. Stunted children and underweight (low weight-for-age) children are more likely to live in a rural area, with the highest prevalence of moderate and severely stunted children (six percent) in rural Upolu. A higher percentage of children with moderate and severe stunting come from families in the lowest wealth quintile.

The Pacific Child Health Indicator Project (CHIP), a clinician-led project with the primary objective to improve child health in the Pacific initially worked with health services in Sāmoa and Tonga. Comparing estimates regarding of infant and young child feeding practices in Pacific Island countries (citation) the proportion of all children age 6–23 months who receive the recommended variety of foods the minimum number of times a day in Sāmoa (40 percent in 2009) is almost same as in Nauru (38 percent in 2007) and in the Solomon Islands (37 percent in 2007), but higher than in Tuvalu (33 percent in 2007), and lower than in the Marshall Islands (55 percent in 2007). One key finding of the CHIP is the number of child admissions in Sāmoa and Tonga with serious malnutrition. It is reported that every week, at least one child is admitted to the National Hospital in Sāmoa with either Kwashiorkor or Marasmus. A clinical audit of malnutrition cases found associations with lack of breastfeeding, lack of understanding of dietary needs, use of traditional medicine and overcrowding (WHO 2011).

Cases of severe malnutrition are associated with children at the weaning age and the DHS showed that malnutrition is not a widespread problem among pre-schoolers. Of the 1107 children aged less than five years that were surveyed, the prevalence of low weight for age was only 1.9 percent (95 percent CI: 1.2-3.0); low height for age was 4.2 percent (95 percent CI: 2.8-6.5) and a low weight for height was 4.2 percent (95 percent CI: 2.8-6.5). These low values are within the range expected in a well-nourished population, given the way the criteria were defined. The research stated that, "although there are sporadic cases of malnutrition admitted to the hospital they do not reflect the tip of an iceberg of a widespread public health problem as regards overall under-nutrition and growth. However this situation could change if there was a large change in food supply or eating habits, for example, after a cyclone" (Department of Health Sāmoa 2002). The Yale University Child Health Survey conducted in Sāmoa in July 2015 concluded that the levels of anaemia in the children and mothers were similar to those reported by the DHS 2014, however the research team reported on much higher levels of stunting in the 2–5 year olds surveyed (25.5 percent of boys and 15.8 percent of girls).

Social Context

Although there has been little research on the social context of child malnutrition, an early study (1977) quoted in the UNICEF situation analysis report on Sāmoa (Government of Sāmoa 2006) states that some malnourished children were of mothers who were “nofotane”. This term refers to women living with the family of their husband. According to Sāmoan customs wives are expected to render service to their husband’s family, especially while they are young. The reference suggests that lack of food in the household was not necessarily the problem but was more likely to be the result of the mother having inadequate time to feed and care for the child whilst catering to other household chores for the extended family. Other anecdotal evidence on social factors is that the common practice of adoption (usually within families) of infants born to single mothers contributes to poor feeding practices. Mixed breast and bottle-feeding is a necessary choice for most working mothers; however the proportion of women who are economically active outside the home is only 27 percent in Sāmoa according to the 2011 Census of Population and Housing.

In general, poor nutrition of both children and adults in Sāmoa is associated with social, economic and dietary change. The national report from Civil Society Organizations (CSOs) on the Millennium Development Goal progress in Sāmoa (Commonwealth Foundation 2013) pointed out that:

While hunger has not generally been a problem in Sāmoa, with subsistence farming playing a crucial role as a buffer for food security, CSOs believe there are indications in the expenditure patterns of the poorest households that many may be getting inadequate nutrition, with some households switching to cheaper, less nutritious food sources.

Dietary patterns of Sāmoan children also show a high level of adoption of modern dietary patterns. Over half of 13–15 year olds participating in the Global School Food Survey in 2011 reported consuming soft drink one or more times every day for the 30 days preceding the survey. In 2003, Sāmoan youths aged 6–17 years were eating fewer serves of papaya and green vegetable per week than they were of cake, chips and soda—and in fact reported being more likely than adults to consume energy dense foods like cake and chips, but less likely to consume papaya and vegetables. The Global School Health Survey conducted in 2010, across in Sāmoa for 13–15 year olds found that 43 percent of boys and 59 percent of girls were overweight, of which 16 percent and 22 percent respectively being obese. The 2014 DHS found that overweight children under five years of age in Sāmoa are more likely to live in the Apia Urban Area and to come from families in the highest wealth quintile with more than secondary level of education.

A clear contradiction prevails in the health patterns of Sāmoa. At one extreme people suffer and die from non-communicable diseases (diabetes, cardiovascular and renal disease), once thought to be the diseases only of affluent societies. At the other extreme there are infectious diseases associated with poverty, poor living conditions and lack of hygiene and sanitation (typhoid, diarrhoea, other gastrointestinal diseases and respiratory infections).

The Government of Sāmoa has enshrined the right to health in the Strategy for the Development of Sāmoa (SDS) 2012–2016. In its vision for an ‘Improved Quality of Life for All’, the government has linked four broad sectors to implement its development strategies. The four broad sectors of Economic, Social Policies, Infrastructure and the Environment have key outcomes that address the right to health. Nutrition is clearly a priority for the Government of Sāmoa and this is reflected in SDS. One of the indicators for the Strategy’s Key Outcome 6 ‘A Healthy Sāmoa’ is ‘to reverse the rising trend in NCDs including obesity’. As reflected in the results of recent surveys, action to improve nutrition, both under and over, is needed. The Health sector has defined the goals and priorities for the period 2008–2018 that will contribute to realizing the vision for a ‘Healthy Sāmoa’ in the Health Sector Plan (HSP) which is directly linked to the SDS under the Social Policies sector. The Sāmoa Health Sector Plan 2008–2018 presents the strategic vision “to regulate and provide quality accountable and sustainable health services through people working in partnership”. In response to the issues of malnutrition, overweight and obesity, the Government of Sāmoa has developed a number of policies, protocols, programs and initiatives including the development of the National Food and Nutrition Policy 2013–2018 with the aim of improving access to safe, affordable, nutritious and sustainable food.

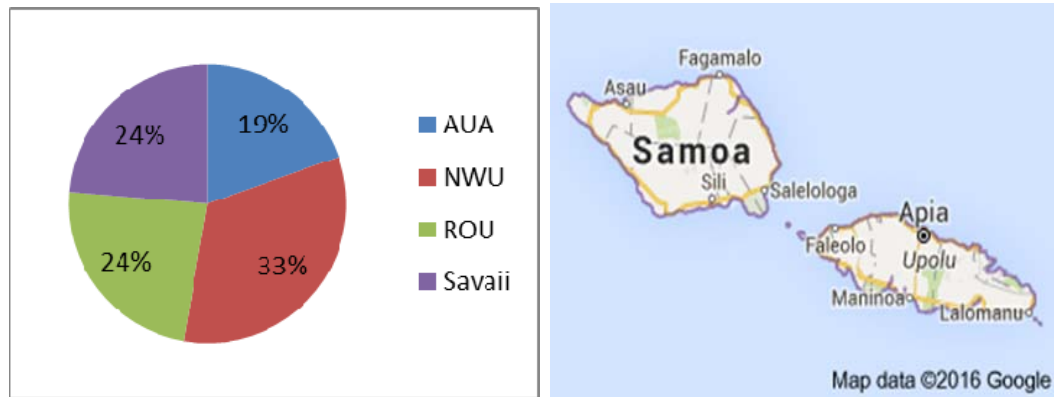
Research Design

In relation to the issues outlined above, a small research project was designed by staff and post-graduate students of the National University of Sāmoa in 2015. It aimed to review the evidence (summarised above) on infant malnutrition, and to design a small representative survey to examine the extent to which the government’s recommended child feeding practices are known, understood and practiced by mothers/caretakers and advised by health workers. The survey applied a knowledge, attitude and practice (KAP) methodology. Nutrition-related KAP studies assess and explore peoples’ KAP relating to nutrition, diet, foods and closely related hygiene and health issues. Assessing nutrition-related knowledge, attitudes and practices offers an opportunity to better understand a given situation by providing insights into the social, psychological and behavioural determinants of nutritional status. The use of the KAP survey in relation to this research was to enhance the knowledge, attitude, and practices of specific infant and young child feeding practices in Sāmoa specifically within two target groups: mothers/caretakers of infants and young children, and public health professionals in district health centres.

Site selection was based on a non-probability purposive cluster sampling method. The population of Sāmoa is approximately 180,000 and statistically, the country is divided into four regions (Figure 1), Apia urban area (AUA), North West Upolu (NWU peri-urban and rural), rest of Upolu (ROU rural), and Savaii (rural). Within these regions sample clusters of villages were chosen. The study sites selected covered a total of eight villages from these four different regions in Sāmoa. These comprised two selected urban villages (Lauli’i and Vaimoso villages) representing the Apia urban statistical

region; Faleasi'u village representing the 'North West Upolu' statistical region, (Lufilufi, Saanapu, and Poutasi villages representing statistical region 'Rest of Upolu', and; and two villages Puapua and Salailua, representing the Savaii statistical region. Pretesting of KAP survey for caretakers and health centre staff was conducted through the first village and health centre identified for study (Lufilufi village and Lufilufi Health centre).

Figure 1: Statistical Regions of Sāmoa



In each of these locations the team met with the village women's committee from which mothers/care-givers were selected for interview. For each of the villages, the district facility was visited and a survey of public health nurses. Similar methodology was used for understanding the knowledge, attitude and practices of healthcare workers on infant and young child feeding practices. For each of the villages, the district facility was visited and a survey of public health nurses through a semi structured interview was conducted to gather responses.

The survey is based on a semi-quantitative questionnaire with multiple-choice questions. The KAP survey design was developed in English then translated into the Sāmoan language and back into English to ensure accuracy of the questions in the local language. The two main targeted groups: caregivers (mothers and grandmothers or other care-givers) and public health nurses in district health facilities were interviewed using a simple scale questionnaire. This allowed response categories for each of the variables. The research questions of the KAP survey were designed to examine the respondent's knowledge, attitudes and practices. A person's knowledge, attitudes and practices are overarching categories that encompass more complex and subtle psychological and social dynamics, such as their self-confidence and their susceptibility to peer pressure. To identify determinants that will enhance behavioural change or which serve as barriers, the KAP survey methodology should include questions that probe to see which of these determinants influence the respondent's outlook and actions. For example of such a question in the KAP survey was: "What would you do in case your child is losing weight?" The design for this survey used closed-ended questions which had a set of pre-determined coded answers from which the respondent chooses, producing numerical data for analysis.

The pretesting methodology involved a discussion with the Women’s Committee members to ensure that questions were relevant and was understood; subsequently some minor changes to the questionnaire were made. The KAP survey was conducted during a one month period from November 9 to 3 December 2015. The required information was collected from every caretaker and health professionals selected by the interviewers. At the end of each research day, the team met in to assess the accuracy and quality of the data collection in every questionnaire. Once the data in the field were collected and all completed questionnaires gathered, the principal researcher (Magbity) entered the data in an excel format together with a member of the research team to ensure accuracy and verify comments made by the interviews in the completed questionnaire.

The research team obtained informed consent through meetings with the women’s committees of each village before the individual interviews were conducted. In each village the project team introduced themselves following Sāmoan protocols and with discussion of the purpose of project team visit. The project team responded to all the questions put forward by village elders on the reason of the research. For example a common question to the team was: “why this village”. The project team explained that the sample selection followed the research methodology and attempted to have villages participating from each statistical region in Sāmoa. In explaining the purpose of the team’s visit guarantees of confidentiality were made by the team to ensure honest responses and complete answers. The team was given food and drinks in each of the villages and following the interviews the visit was celebrated with singing and dancing with the members of the team to thank them for their visit and for taking an interest in their village. Following Sāmoa culture, each respondent was thanked for their participation with a gift of SAT\$20.00 (approximately USD\$8.00).

Characteristics of the Sample Surveyed

Age: Out of the total of 102 respondents, around 23 percent are below 29 years. The mean age was between 30–39 years (31 percent). Approximately 24 percent of the respondents were aged above 50 years and were caring for children under five years of age as grandmothers or aunts, as is common in Sāmoan culture.

Income:

Poverty rates are assessed as the proportion of the population living on less than \$1.25 a day, measured at 2005 international prices, adjusted for purchasing power parity (PPP). The Sāmoa Human Rights Report of 2015 presents data showing that approximately 20 percent of Sāmoa’s population lives below the basic needs poverty line; the highest proportion of those falling below the basic needs poverty line are found among rural populations, and indicating that approximately one in every five Sāmoans lives in poverty. Of our sample surveyed, more than 56 percent of the respondents live on a monthly income less than SAT \$400.00 per month, which equals approximately USD \$160.00 per month. A further 37 percent of our respondents live on

a daily rate of USD \$3.87 per day (less than USD \$120.00 per month or WST \$300.00), which is just above the USD \$1.25 a day poverty line.

Education:

Out of 102 respondents, three percent of the caretakers have no education, 10 percent have gone through primary education and the majority, 83 percent completed secondary school education (n=85), and four percent had a university degree.

Housing:

A total of 54 out of 102 respondents (53 percent) have a Sāmoan open-sided house built with permanent materials, 15 percent have an open-sided house built from traditional materials (fale o’o), while 31 percent reported to have an enclosed house built with permanent materials.

Number of children:

Approximately 52 percent of respondents had more than one child less than five years of age. Of the total of the caretakers, 67 percent have more than two children within the household between 5–18 years and 30 percent have four or more children per household. The mean number of children was three children per household

Household size:

Around 53 percent of the caretakers reported to live in a household of nine or more persons and 24 percent live with more than twelve persons.

Primary occupation:

Almost 90 percent of the mothers/caregivers were home-makers. Of the fathers/husbands of caregivers, 77 percent were employed of whom 36 percent were farmers while other worked as teachers and security guards.

Research Findings

Knowledge of best practices for breastfeeding

Government policy follows WHO and UNICEF recommendations for exclusive breastfeeding for up to six months of age, with continued breastfeeding along with appropriate complementary foods up to two years of age or beyond. The KAP survey aimed to understand the knowledge of these recommendations and the extent of their practice. Nationally, the Sāmoa Demographic Health Survey of 2014 found that 87.6 percent of infants are breastfed within the first hour of life, and 97 percent within the first 24 hours. 51.3 percent of infants under six months were exclusively breastfed, 6.3 percent of infants below 6 months were not breastfed, 23 percent were fed with a combination of breast milk and food, and 13.7 percent were introduced to other milks and 72.1 percent of children (12–15) months continued breastfeeding.

One of the questions in the KAP survey on exclusive breastfeeding duration was: “How long should you give only breast milk to your child”? Table two shows the generally positive finding on the knowledge of caretakers about exclusive breastfeeding duration.

Table 2: Exclusive Breastfeeding Duration

How long should you give only breast milk to your child?	Frequency (n)	Percent (%)
Birth to 1 month	3	3 %
Birth to 2-3 months	9	9 %
Birth to 6 months	50	49%
More than 6 months	40	39%
TOTAL	102	100 %

The majority of caretakers (88 percent) had knowledge about the duration of exclusive breastfeeding and 39 percent stated they breastfed their children up to six months and more. In answer to the question: “when breastfeeding should be started”? Five answer options were provided and the analysis showed that 95 percent of caregivers know that breastfeeding should be initiated within the first hour of birth. More than three quarter of caregivers (75 percent) said that breastfeeding should be given when the baby cries or on demand, which could amount to seven–eight times per day. Another positive finding is that 88 percent (n=90) said they had been taught how to breastfeed. Of this group 75 percent had been taught by a nurse or a doctor and the remaining 25 percent by their mother or other family member.

Complementary feeding

Somewhat less positive was the result on complementary feeding. In response to the question: “at what age do you introduce complementary food (solid food)” as only 56 percent said it should to start at 6 months of age; 27 percent said it should start earlier than six months (five percent at three months, seven percent at four months and 15 percent at five months) while 15 percent said it should start at seven months of age (Table 3). Common explanations for early supplementary feeding of their babies were that supplementary food “helps the child to grow well” or that “breast milk is not sufficient for the child to grow and be strong”. Only two percent were uncertain about when to start complementary feeding as well as the duration of exclusive breastfeeding.

Table 3: Introduction of Complementary Food

At what age do you introduce complementary food?	Frequency (n)	Percent (%)
3 months	5	5%
4 months	7	7 %
5 months	15	15 %
6 months	57	56%
7 months	15	15%
Not sure	2	2%
TOTAL	102	100 %

When asking the caretakers: “What advice did you receive from the health centre about when to start complementary feeding to your baby?” 84 percent reported they had been given the advice to start at six months of age, which is in line with the global recommendation from WHO and UNICEF. However, eight percent of the caretakers reported to have been given the advice to start before six months of age and seven percent reported that it was instructed to start when baby got teeth. The majority of caregivers (77 percent) would continue to breastfeed over six month, 41 percent stated they would continue to breastfeed up to one year, 24 percent up to three years and 12 percent up to four years and more.

Some women had poor knowledge of the recommended frequency of complementary feeding: When asked “How often per day should baby over 6 months have solid food, 28 percent of the caretakers said that they believed it should be given only once per day. This may explain the data reported in the DHS with regards to under nutrition.

More detailed research would be needed to validate the frequency of complementary feeding. This study aimed mainly to review the knowledge, attitude and barriers towards infant and young child feeding and did not conduct nutritional assessment or household visit to observe the quantity provided. It should be noted that the Sāmoa DHS 2014 has more detailed data on the quantity of complementary feeding. In the DHS it is reported that 40 percent of children 6–23 months (breastfed and non-breastfed) from urban residency are being fed at least two times or more, in rural residency this is slightly higher with 49 percent of children been fed at least two times or more.

According to the WHO and UNICEF recommendation of Infant and Young Child Feeding (IYCF) Practices, children aged 6–23 months should receive complementary foods from at least three food groups. In total seven food groups can be distinguished: the first food group contains the milk products consisting of milk products, infant formula, cheese or yoghurt. The second food group contains foods from grains and roots and the third food group should be made of the Vitamin A rich foods such as fruits and vegetables. The fourth group are other fruits and vegetables, fifth are eggs, sixth group are meat, poultry and fish, seventh group legumes and nuts and eight group foods made with oil, fat and/or butter.

According to the 2014 DHS, 63 percent of children aged 6–23 months in Sāmoa received complementary feeding from minimum three or four of these food groups. Data from this study showed that the foods included semi-solid and solid food, such as taro, papaya, banana, pumpkin and soup. The majority of caretakers would prepare these food types for the infant and child. Only three percent would buy baby food from the shop. Table four compares our findings with the DHS data from 2009 to 2014, which concluded that in both breastfed and non-breastfed children there was a substantial reduction of complementary foods in the critical weaning period (6–23 months), indicating that complementary feeding practices had declined over the past five years.

Table 4: Comparison DHS and NUS Study on Child Feeding

Indicator	DHS 2014	NUS Study 2015
Initiate breastfeeding within the first hour of life.	81%	95%
Initiate breastfeeding within the first 24 hours.	98%	95%
Exclusively breastfeeding, infants at 6 months.	70%	39%
Introduction of complementary foods at 6 months of age.	90%	56%
Complementary food and continuation breastfeeding.	90%	77 %

Only 56 percent of caretakers interviewed in this study introduced complementary foods at six months of age and 28 percent of the caretakers said they only gave solid food once a day. The key issues are the timely introduction of solid or semi-solid foods at the age of six months and the gradual increase of consistency, frequency, amount and variety of foods as the child gets older, while maintaining breastfeeding up to two years of age. During the introduction of complementary feeding, children are at high risk of under nutrition. Complementary foods may be of inadequate nutritional quality, or they are given too early or too late, in too small amounts, or not frequently enough. Breastfed children are considered fed in accordance with the minimum standards if they consume at least three food groups and receive foods other than breast milk at least twice per day in the case of children age 6–8 months.

Growth Monitoring

Only 30 percent (n=31) monitored the growth of their child through regular visit at the health centre. The majority of caregivers (67 percent n=68) said they assess the growth of their child based on their own knowledge. Three respondents said they would ask members of their village Women’s Committee to check that their child has normal growth. When asked: “What would you do if your child is losing weight”, more than 81 percent (n=83) of caretakers stated that they will visit the nurse at the health centre, while 20 percent said they would to visit a traditional healer or both a traditional healer and a nurse.

Hygiene: Most of the respondents said that they knew that hand-washing was a good hygiene practice.

Child Feeding Knowledge and Reported Practices of Healthcare Providers

Characteristics:

In total six health facilities were part of this study, four in Upolu and two in Savaii. In total 20 healthcare professionals were interviewed and all but one of these was female. 40 percent were aged younger than 39 years; 10 percent (n=2) were aged 18–29 years and 30 percent (n=6) were aged 30–39 years of age. The majority, 60 percent (n=12) were aged 40 years and upwards, one being aged over 70 years of age.

All of the 20 healthcare providers interviewed were nurses and of these there were 10 qualified as midwives, five as registered nurses, three as enrolled nurses and two as auxiliary nurses. In terms of educational background, 65 percent had tertiary education (n=13) and 35 percent (n=7) had secondary education. The median period of service among these the nurses was from 16–20 years; most of them had worked already 11–15 years at the same location, so they knew their communities well.

The nurses reported that they saw most children aged between 0–24 months of age living in their area of responsibility. These age groups are the most commonly presented in the health facility or during their outreach in the villages. The most common diseases noted within these age groups were respiratory illness and diarrhoea. Feeding issues reported were inappropriate feeding practices such as giving young children in this age group ‘junk food’, lack of knowledge by the mother with regard to healthy foods, bottle feeding, teenage pregnancy, and late attendance at the MCH clinic. Some noted that there was increased frequency of malnutrition cases during the rainy season.

All nurses said they provided nutrition education to caretakers, especially to prenatal women and mothers, with 75 percent reporting that they provided nutrition training for mothers once a week at their health facility. The topics covered during their nutrition education sessions were reported to be on breastfeeding, healthy diet, hygiene and training on antenatal care, and the prevention and management of child malnutrition. The barriers reported by the health care providers in terms of providing education to caretakers in nutrition were lack of teaching resources, certain cultural and traditional issues, and lack of time to speak with patients.

Knowledge, attitude and reported practices: The health workers all demonstrated a good knowledge and attitude on infant feeding. Breastfeeding advice was the subject that nurses considered to be of the highest value for promoting infant and young child feeding practices. This scored as the most relevant information, followed by growth monitoring according to the WHO growth curves to spot underweight or overweight in children. All 20 healthcare providers said they used growth charts in the child health book in their every day job. All 20 respondents scored correctly on the question: ‘When breastfeeding should be started’; all of them stated within the first hour after birth. The same success was measured when asking how long exclusive breastfeeding should be continued; all 20 respondents stated it should be continued for at least 6 months of age. When asking the reason of why they believe exclusive breastfeeding is important,

55 percent (n=11) stated that it protects the infant from infection, 20 percent (n=4) said that breast milk is the ideal food for infant and the rest stated it will help the infant to grow properly.

When asking how long they believe breastfeeding should continue, 75 percent (n=15) stated at least for 2 years but also other options were given such as 5 years and upwards, until the child refuses or up to 3–4 years. When the infant is sick, 45 percent (n=9) advised mothers to continue with breastfeeding, or increase liquid intake for the infant. 60 percent (n=12) said they advised pregnant women to eat more food; to “eat for two” (although increased calorie intake is only recommended during last trimester of pregnancy). All the respondents showed correct knowledge regarding infant and young child feeding that complementary feeding should be introduced at six months of age. The majority, 90 percent (n=18) said they would advise mothers to continue with breastfeeding after introduction of complementary feeding at six months of age and after.

The majority of the respondents 85 percent (n=17), said that they believed that most cases of malnutrition result from the mothers lack of knowledge, also insufficient breast feeding and complementary feeding. All respondents said they gave specific recommendation on the quality of complementary feeding for infants over six months of age. Examples given were bottle feeding, mashed vegetables mixed with meat or fish to feed the baby to ensure they have a variety of nutrient intake. Around 60 percent (n=12) said they would briefly advise caregivers on the types and ways to prepare complementary foods. Some of them said they would use the opportunity to provide this advice during the child immunization and antenatal visits.

The nurses all said that they had seen a number of malnutrition cases, around 20 cases per year, and that most were referred to the hospital; however they said that follow up of these cases in the community was challenging. Giving infants un-boiled water was regarded as a main cause of diarrhoea and well as lack of hygiene contributing to other health problems. 40 percent (n=8) stated that adoption and the absence of the birth mother to breastfeed was an issue, 25 percent (n=5) believed the cause was inadequate feeding, and 35 percent believed this was a combination of the above. The majority report poor growth as one of the sign for malnutrition but other signs reported were when the child is not reacting or is visibly tired. In cases of malnourished children presenting at the health facility, 95 percent (n=19) said they would provide in-facility treatment with oral rehydration support. Only one respondent said she would follow the malnutrition protocol and introduce F75 feeding for rehydration and for severe acute malnutrition F100 for six days and then F75 for 1–6 days or coconut water.

When asking what could prevent malnutrition, 55 percent (n=11) stated exclusive breastfeeding for six months. Others mention the need for more frequent infant feeding by caretakers, for better follow-up with the community, and for more health talks on the television and radio. Other measures suggested were to hold mobile health

clinics to the community, and for the community themselves to take a role to encourage better health practices. With regard to the social context of the child malnutrition cases they had seen, respondents mentioned the family's poor living environment, teenage pregnancy, adoption, and lack of breastfeeding. Traditional or religious beliefs were reported as key barriers for treatment of early signs of malnutrition, as well as lack of awareness, teenage pregnancy, and inappropriate advice from traditional healers.

Conclusions

Although this study only draws on a small sample, it covered villages in four regions of the country and found no significant regional difference in the knowledge, attitude and practice of those surveyed. The findings are generally positive. Public health nurses understood and professed to practice the recommendations that are endorsed by the government and by international agencies on the best practices for feeding infants and young children. However it was evident that they need more training and supply of resources to treat malnourished infants.

Mothers and other care givers generally had a good understanding of the positive benefits of breastfeeding immediately after giving birth and for the first six months, although some needed this message to be reinforced so they fully understood why this is important. However there was a very evident need to improve their understanding was in relation to the introduction of solid foods, the ideal food to be given, and the need for more frequent feeding. Almost one third of those surveyed needed to learn more to improve their understanding of how best to nourish an infant by feeding small amounts at least twice a day and increasing the feedings until the child is two years old. More research is needed to identify why caretakers have not followed recommended practices and how to change behaviour. Further, more than half did not take their child to the health centre for growth monitoring where they could receive guidance on feeding their child.

The fact that there is no systematic outreach for mothers of children under 12 months, and especially for caregivers who are not the biological mother of the child they are caring for is a concern and indicates an area in which maternal and children health care services could be strengthened. Until the 1980s in Sāmoa monthly village maternal and child Health (MCH) clinics were attended by the district public health nurses in meeting houses organised by the village women's committee. These organisations had authority in local governance matters related to community health, which was delegated to them by the village council and could fine the families of mothers who failed to bring their children for monthly health checks or to immunization clinics (Schoeffel 2016). Our research findings suggest that there is a case for the re-introduction of this village-based service. The findings also suggest the need for further research on traditional beliefs related to infant feeding and on the potential for educating traditional healers on best practices.

Acknowledgement

The research team thanks the National University of Sāmoa for funding this research through the University Research and Ethics Committee in 2015.

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