

Audience

This policy brief is for policy makers, program managers, researchers, and other professionals dealing with nutrition, health, community development, and social and behaviour change and those with an interest in maternal and child health and development in Vihiga County.

Purpose

There is increasing recognition of the need for implementation research that is designed to provide context-specific information and data to inform decisions for planning nutrition and public health interventions. This brief provides evidence for decisions to improve maternal and young child nutrition derived from a systematic landscape analysis in the county.

1. Introduction

This policy brief summarises key results from a study designed to identify potential interventions to improve nutrition in infants and young children in Vihiga County, Kenya. The study was commissioned to provide information necessary for the design of appropriate high-impact nutrition interventions in Vihiga to improve nutritional outcomes at the household level.

The study was conducted in Vihiga County, which is located on the fringes of the Rift Valley in the Lake Victoria Basin at 1,300–1,500 metres above sea level. Despite a favourable climate and soils, Vihiga County is not self-sufficient in food production. Most of the food needs are met by importing foods from other regions. In general, food insecurity in the county is associated with low agricultural yields, natural calamities, low returns on farm produce, and low household income

Two research approaches were used in Vihiga County:

- Ethnographic research was

conducted using the GAIN-initiated Focused Ethnographic Study of Infant and Young Child Feeding Practices (Pelto and Armar-Klemesu 2014).

- A dietary assessment and an application of Optifood, a linear programming software tool.

An FES applies well-established ethnographic methods to obtain data from caregivers on determinants of dietary practices, including social, economic, cultural, technological, and environmental factors (Pelto et al. 2012). This research approach uses sampling procedures that ensure representation of economic strata and age sub-groups of infants and young children 6–24 months of age. Optifood is a research tool that uses data obtained from dietary intake measurement to reveal the strengths and weaknesses of current diets. It identifies locally appropriate food-based modifications to improve dietary adequacy, taking into account local dietary norms, food use practices for infants and young children,

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and associated constraints (Ferguson et al. 2006). These two approaches combined are used to identify context-specific opportunities

and limitations for dietary improvement through behaviour change interventions (Hotz et al. 2015).

2. Overview of the Situation: The Importance of Nutrition in Infancy and Early Childhood

Adequate nutrition is essential to growth, health, and development during infancy and early childhood. Under-nutrition, caused by inadequate diets, and other factors that influence nutritional status, including poor sanitation, disease and care, is an underlying factor in 45% of child deaths (Black et al. 2013). The immediate consequences of poor nutrition during the early formative years include significant morbidity, mortality, and delayed mental and motor development. In the long term, early nutritional deficits are linked to impairment in intellectual performance, decreased work capacity, and poorer reproductive outcomes and overall health during adolescence and adulthood. The ‘1,000-day window’—the period from conception to a child’s second birthday—is a critical time frame for the promotion of optimal growth, health, and behavioural development (World Health Organisation [WHO] 2010).

IYCF practices are a major determinant of child nutritional status outcomes. Optimal IYCF practices include exclusive breastfeeding for the first 6 months, appropriate complementary feeding from 6 months through at

least 2 years, and continued breastfeeding to 2 years of age. Appropriate complementary feeding includes timely initiation of solid/semi-solid foods from 6 months of age; increasing the amount, density, and variety of foods; increasing the frequency of feeding as the child gets older; responsively feeding the child; and ensuring that good hygiene practices are used in preparation and feeding, while maintaining breastfeeding.

IYCF practices in Kenya are currently less than optimal. Only 25% of young children are fed adequately diverse diets (Kothari and Abderrahim 2010). In previous research, caregivers, families, and communities in Kenya have been reported to lack up-to-date knowledge of optimal IYCF practices, particularly during the complementary feeding period (Thuita 2008; Nduati et al. 2008; Israel-Ballard et al. 2009). Improving complementary feeding practices amongst Kenyan children aged 6–23 months could significantly contribute to improved child survival, health, and development.

3. Overview of Methods

To assess current practices and identify potential interventions to improve nutrition in infants and young children, researchers used the FES manual and protocols (Pelto and Armar-Klimesu 2014). Each protocol consists of a set of modules, which are administered through in-depth one-on-one interviews. The modules are designed to explore a range of issues, including foods for infants and young children, food preparation and feeding practices, sources of food

acquisition and food expenditures, types of problems faced by parents of infants and young children, food and nutrition problems of infants and young children, perceptions about health and food, and perceptions about micronutrient supplements and fortification of infant foods. The modules’ open-ended questions were administered with extensive probing to expand and interpret the initial responses. The nutritional assessment of IYC diets was done via a cross-sectional dietary

survey and analysis using Optifood software (Ferguson et al. 2015).

4. Results

Infant and young child diets

In Vihiga, breastfeeding rates through the first 18 months of life are high, and a majority of mothers continue to give breast milk up to 24 months. However, analysis of the current diets of infants and young children (6–23 months) showed that they are inadequate in many nutrients.

The complementary diets of these children were predominantly composed of porridges (based primarily on unrefined maize flour and secondarily on the preferred grains, i.e. millet and sorghum), *ugali* (a stiff maize flour-based porridge), vegetable stews, and broths. Most children consumed milk, either as a separate beverage or added to tea or porridges. *Mandazi*, a product made from wheat flour, was commonly consumed amongst children 12–23 months of age, while animal flesh foods and fresh fruits were less commonly consumed.

The limited number of foods commonly consumed by children in Vihiga was reflected in the relatively low dietary diversity scores, a general measure of the quality of the diet. Just over half of children (57%) achieved the minimum dietary diversity of 4 food groups or more for children 6–23 months of age (WHO 2008)..

The nutrient density in the infant and young child (IYC) diet, another measure of dietary quality, was often low. The nutrient densities of diets of children 6–8 months old were below WHO desired levels for 8 of 10 key nutrients examined (the exceptions being vitamin A and vitamin C). For the age sub-groups in the 9–23 month range, nutrient densities were below desired levels for 4–6 of the 10 key nutrients. The most serious problem nutrients were calcium, iron, and zinc in all age groups, and, to some extent, vitamin B12 and folate, after accounting for

estimated breastmilk intakes (Ferguson et al. 2015).

Increased frequency of feeding specific, locally available foods could go a long way in filling nutrient gaps in the IYC diet. This includes consumption of animal milk one or two times a day every day (added to porridge so as not to encourage displacement of breast milk); inclusion of green leafy vegetables and legumes one or two times a day every day; and increasing feeding of fortified cereals to three times per week and small fish (or other animal foods) to five times per week.

While incorporating these changes into current diets would allow infants and young children to meet their requirements for nine nutrients (6–11 months) or seven nutrients (12–23 months), adequate intakes of iron, zinc, and folate would be difficult to achieve, and additional solutions are required to increase access to rich sources of these nutrients beyond current food use and dietary patterns (Ferguson et al. 2015).

Food acquisition for infants and young children

The results indicate that not only do caregivers generally access foods through markets, but several food items used specifically in IYC diets are obtained primarily from markets. None of the families in the study produced all of the foods that they needed to feed themselves and their children. The amount of time that they could rely on home-produced staple foods varied, but was never more than a few months, partly because of agricultural resource constraints and partly because some home-produced food is sold to meet other essential needs that require cash.

The preferred grain for infant porridge is millet, which is almost always made from a commercial source, either a branded product

or a generic flour. Other commercially produced, multi-grain porridges are also given to infants and young children. When millet porridge is not available, maize flour porridge is given. The maize flour may be purchased or comes from milling home-produced maize or purchased maize.

Caregivers' nutrition knowledge

One important finding is that caregivers generally have sound nutrition knowledge about feeding infants and young children. They have acquired this from many sources: school, medical professionals at health clinics, and community health workers. Most importantly caregivers are aware of and strongly committed to the idea that what children eat affects their growth and their health. Their knowledge accords well with contemporary thinking about IYCF.

'You need to diversify the baby's diet. [If not] the child may develop some diseases as a result of malnutrition ... The baby needs a balanced diet to grow healthy and be well'.

For the most part, cultural beliefs are not preventing caregivers from using affordable nutritious foods that are available in their environments, and there is evidence that older beliefs are giving way to modern ideas. However, a few foods that are nutritious are regarded as foods to avoid giving to children. For example, some caregivers are hesitant to give sweet potatoes:

'Sweet potatoes and maize are bad for children because it makes their stomachs ache'.

Another caregiver said of sweet potatoes:

'They cause the stomach to swell because they cannot be digested'.

In the process of preparing foods and serving them to infants and young children, caregivers often use ingredients that are viewed as 'additions' to the basic dish, rather than essential ingredients. These 'additions', which are sometimes added just before

serving and sometimes during preparation, include milk, sugar, oil, vegetables, and, for foods that are prepared for the family and given to young children, seasoning cubes.

There was no suggestion in the data that caregivers are generally averse to modifying or adding something to IYC foods, a finding that has implications for some types of interventions.

There are major gaps between what caregivers want to feed their infants and young children and what they are able to give them. Mothers would like to feed more nutritious cereals, but much of the time they are forced by lack of resources to feed maize porridge, a food that they regard as less healthy. They want to give more animal-source foods, but they cannot afford them:

'Money is important so that you get the right foods for the child. You must have money in your hands to buy the food'.

Lack of money to buy seeds also affects home production, which, in turn, affects what they can give their children:

'I would like to grow vegetables in a home garden, but I don't have money to buy seeds'.

Hygiene and food safety

Another positive finding is that caregivers have well-developed ideas about food hygiene and the importance of protecting food from contaminants. They are aware of and concerned about personal hygiene, food hygiene, and food safety. They attempt to give their children both nutritious and safe food. However, their preparation and storage practices may still put children at risk of food-borne diseases because they do not have sufficient and consistent access to the technology to ensure food safety.

Caregivers prepare food over wood fires that require substantial efforts, both to acquire firewood from the surrounding countryside and to build and maintain the fire. They

cannot readily prepare or reheat food for their children on a schedule to meet children's needs, which means that prepared foods have to be stored for many hours without benefit of refrigeration that would prevent growth of pathogens.

'I store it in a thermos flask and keep it in the cupboard and it keeps from morning 8am to around 4pm'.

While the picture with respect to caregiver knowledge and practice is generally favourable, there were two areas of weakness that emerged from the study:

- The use of black, sugar-sweetened tea, often served without milk, is a frequent dietary component. Caregivers prepare this in the morning and store it in thermos bottles or other containers, so that it is handy to feed during the day, in response to child thirst. It is also left to be fed by alternate caregivers when mothers are away.
- Food is commonly stored under unsafe conditions after its initial preparation.

For both of these findings, the results indicate potential problems, but they do not provide definitive evidence of adverse effects on IYC nutrition and health. Further studies are required to confirm this.

Food insecurity

Food insecurity is a widespread concern and common condition for caregivers in Vihiga throughout the year, not just during the dry season. The majority of caregivers brought up this issue when asked what challenges they face in raising their children. It was often the first problem they discussed. Because no households are growing all of their own foods, food insecurity is manifested as 'a lack of money to buy food', as well as a lack of food from their own production.

Although many families face food insecurity throughout the year, the problem is more

severe in some months than in others. During periods of food insecurity, caregivers adapt their recipes. They make simple dishes without the additions that add flavour and nutrients. Caregivers described preparing foods for their infants and young children without oil, sugar, and milk. This leads to problems in children's acceptance of food and to the loss of nutritional qualities in their diet. Caregivers described efforts to buffer their children from food insecurity by skipping meals themselves and eating less. But these compensatory moves are not sufficient to prevent nutritional and behavioural problems in their children.

The ability of households to cope with food shortages is dependent on many factors. Some of these factors are related to differences in household agricultural management and conditions, including the amount of staple foods grown for home consumption; in availability and types of household plots to extend the growing season; and in the feasibility of growing a diversity of crops to expand the range of food available during the good months and fill in gaps during the worst months. Other factors are related to social and demographic conditions, including the number of adults who contribute financially to the household, the size of the household and the number of children, and health conditions of the household's adults. Single mothers have the most difficult time coping with food insecurity, and their children are at greatest risk of malnutrition.

Caregivers engage in a variety of activities to meet the challenge of not enough food and the lack of money to buy food. Their activities include performing specific jobs for others in the community to earn small amounts of money, short-term entrepreneurial activities, borrowing food and/or money from relatives, and buying food on credit at local stores.

'I talk to my neighbours to give me jobs like fetching water from the river in order to obtain money for my baby's food'.

‘When I don’t have money I ask my mother, and she tells me: “My child, what can I do? Even me, I don’t have much in the house”’.

Emotionally, periods of serious food shortage are very difficult:

‘Sometimes, especially the bad times, I have no money to buy food for my child. I go out to look for food from my relatives. I look for any work that can earn me money. If all of that doesn’t work, my baby stays hungry. I feel so bad. I keep wondering what next. So many thoughts cross my mind. I lack sleep’.

5. Summary and Conclusions

Caregivers appreciate the health value of the nutritious foods in their local food system and use them to the extent that their limited resources permit. However, the foods that caregivers have access to and that are culturally acceptable as foods for infants and young children do not provide an adequate basis for healthy IYC growth and development. Although dietary adequacy can be improved using behavioural change interventions, they alone are insufficient; additional interventions are needed to facilitate access to nutritionally adequate diets for all infants and young children.

Caregivers appreciate the importance of good hygiene and food safety, but are constrained by technological conditions, including inadequate access to water; the difficulty of obtaining and cooking with firewood, their only fuel; and the lack of refrigeration. They prepare special foods for their infants and young children once a day and are not able to prepare fresh food over the course of a day. These technological constraints, together with the demands of farm work and hours spent working to earn money, contribute heavily to severe pressures on caregivers' time, including time for taking care of and interacting with their infants and young children. The lack of good child care options when women must be away from their children is a source of worry for mothers and a serious problem for optimal child health.

In sum, the results show that a number of different factors are responsible for poor nutrition in infants and children, and it is not possible to identify one that is most important.

Implications for intervention actions

The implication of the finding that multiple factors are responsible for under-nutrition can be viewed as either a discouraging or a positive outcome. It is discouraging because it shows that there is no one simple solution,

comparable to giving an antibiotic to cure an infection. But the positive outcome is that many different actions can be taken, each of which will contribute to improving the nutrition of infants and young children in Vihiga. Some of these actions are 'nutrition-specific' and some of them can be termed 'nutrition-sensitive', (described below). The potential actions vary in the time frame needed to implement them and the resources that are required, and in the time it will take to show results. They also vary in the policies that are required to initiate and support them.

Specific suggestions for actions are described in the next section. We conclude this section on "implications for intervention actions" by noting the importance of increasing the market accessibility of nutritious foods, such as through food systems approaches or local entrepreneurial ventures designed to increase the availability of nutritious foods at affordable prices, as one part of the equation for filling nutrient gaps. Caregivers are heavily oriented to purchasing healthy foods for infants and young children from the market. But market-sourced foods must be financially accessible to households, and improving caregivers' income stream is therefore essential to realise benefits from market-dependent interventions. As one caregiver said:

'Money is important so that you get the right foods for the child. You must have money in your hands to buy the food'.

Recommendations

In this section, we make suggestions for two types of interventions, 'nutrition-sensitive interventions' and 'nutrition-specific'. Nutrition-sensitive interventions refer to a class of development activities, for example in agriculture, safety nets, early child development and schooling, that affects nutritional status and well-being because they

address the underlying causes of undernutrition, while nutrition-specific interventions are those that address the immediate determinants of nutrition (Ruel et al. 2013).

Nutrition-sensitive interventions related to technology and environment actions

- Improve access to clean water sources.
- Introduce fuel saving stoves and technologies
- Introduce stoves that use alternatives to firewood.
- Develop better methods for safer food storage.

High-priority interventions in agriculture

- Identify the explanation for the reported problems in household millet production and improve household capacity to grow millet.
- Improve local milk production, at both the household and community levels.
- Improve access to green leafy vegetables year-round through introduction of homestead or community gardens.

Interventions to improve household food security by shoring up household economic status

- Create new income-earning opportunities for women through non-farm activities, including expanding current craft production. Other potential income-earning could include small-scale manufacturing. Such development efforts must be implemented in a fashion that protects breastfeeding and ensures that infants and young children are not left in the care of inappropriate caregivers.

- Develop and expand programs to identify and provide financial support to women and households in Vihiga who are at risk during periods of financial hardship.

Interventions to improve household capacity to provide quality care for infants and young children

- Develop services and programs to address psychological stress in women, particularly depression, because there is growing evidence that health and development of infants and young children is seriously negatively affected by maternal depression, and the results of the study suggest this is a common problem.
- Develop alternative, affordable, short-term care facilities for infants and young children so that women can engage in domestic and income-earning activities without endangering their own and their children's health.

Nutrition-specific interventions

- Contextualise existing behaviour change communication and nutrition education messages used in community and public health nutrition activities to include the dietary changes that have been identified. Use foods that are currently seen as 'additions' to IYC diets and identify ways to strengthen their nutritional content.
- Introduce micronutrient-based home fortificants and explore the feasibility of implementing other home fortification practices. Another potential intervention is to further promote fortified foods that caregivers are already using to feed their children.

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