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Original Research Article

Local Foods Used for Porridge and Complementary Foods Vendors Nutritional Knowledge

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ABSTRACT

The first two years of life provide a critical window of opportunity for ensuring children's appropriate growth and development. However, the complementary feeding period is the peak incidence of growth faltering, micronutrient deficiencies and infectious illnesses. The aim of the study was to assess the nutritional knowledge of local food vendors on complementary foods. The study was conducted in major markets of Vihiga County, Kenya using a questionnaire and observations. A total of 36 vendors were sampled from seven markets. The vendors were selling cereals, legumes, nuts, roots and tubers. The main food made from the products sold is porridge. 50% of the vendors prepare flour mixtures for sale to the clients and 77.8% of them advise their clients on preparations. Those who admitted having no knowledge of the benefits of the foods were 8.3% while 66.7% could mention the benefits of the foods they were selling. There were differences in knowledge on proportions, mixtures and preparations used by various vendors. There is need to educate consumers on updated nutrition education that gives information on nutrients and their importance while pointing out the recommended food sources

Key words: Complementary feeding, Flours, Vendors.

INTRODUCTION

The first two years of life provide a critical window of opportunity for ensuring children's appropriate growth and development through optimal feeding (World Bank, 2006). Exclusive breastfeeding is recommended for the first six months of life. After six months, an infant's need for energy and nutrients exceed what is provided by breast milk, and complementary feeding becomes necessary to fill the energy and nutrient gap (Dewey & Brown, 2003). Complementary foods need to be nutritionally adequate, safe, and appropriately fed.

In many countries, the complementary feeding period is the peak incidence of growth faltering, micronutrient deficiencies and infectious illnesses (Dewey and Adu, 2008). In Africa, 65% of 6-9 month-old infants receive complementary foods in addition to breast milk, compared to 52% in the Mediterranean countries (Dop and Benbouzid, 1999).

The first complementary food given to African infants is a thin cereal porridge often made of a single cereal, maize, millet or sorghum (Dop and Benbouzid, 1999). The selection of flour for porridge preparation depends on available food types, based on agro-ecological zone (Kinyuru *et. al.*, 2012). In Sahelian countries of West Africa, porridge is usually made from millet while in Coastal West African states, from

Côte d'Ivoire to Nigeria, maize is most often used (Dop and Benbouzid, 1999). In Nigeria imported cereals, rice and oats, are also used (Dop and Benbouzid, 1999). In Malawi, soya bean flour is added to maize flour. In Congo, a fermented maize paste or cassava is used (Dop and Benbouzid, 1999).

Traditionally, germination and fermentation were used in preparation of cereal porridges (Oniango *et.al.* 2003) and mothers stuck to one cereal (Kinyuru *et. al.*, 2012). West African diets are poor in heme iron since cereal-based diets are high in phytates and fiber that reduce the absorption of iron and other micronutrients (Lopriore and Muehlhoff, 2003). Low iron intake together with malaria, are the leading causes of anemia in West Africa (Lopriore and Muehlhoff, 2003). Fermented cereal porridge is used in many countries. In poor populations, infants fed imported foods will not be given sufficient amounts of these foods to satisfy their energy and nutrient requirements, because the foods are too expensive (Dop and Benbouzid, 1999).

In Kenya, two in ten children age 6-23 months consume an acceptable diet (ICF MACRO, 2014). Children ages 12-17 months are slightly more likely than children in other age groups to consume an acceptable diet (24%). According to ICF MACRO, 2014, about one-quarter (26%) of Kenyan children are stunted (higher among rural children than urban children while Wasting in children is inversely related to household wealth. In addition Vihiga County stunting rate is at 23.5%, Wasting 2.6% and Underweight 5.9%.

A study done in Kisumu west (Kinyuru *et. al.*, 2012), indicates that millet flour was the basic weaning porridge while maize flour was used in later weaning stages The study indicates that preference for millet is attributed to its dark color, attributed to rich nutritional value.

METHODOLOGY

The study was conducted in Vihiga County, Kenya. Vihiga County is considered a rural area. The County Human Poverty Index is 27 against the national index of 29.1. The poverty level is 41% compared to national poverty level of 45.9% (CIDP, 2014). Crop production is the mainstream of the county's economy and the main food crops produced are maize, beans, millet and sweet potatoes with most of what is produced endings up in markets. Other crops being planted are sorghum, cassava, sweet potatoes and bananas (CIDP, 2014). The study's objectives were to establish the local foods used for preparation of porridge and to determine the level of nutritional knowledge of vendors on the mixtures used.

Major markets were identified in all the five sub counties of Vihiga County namely; Vihiga, Emuhaya, Luanda, Hamisi and Sabatia sub counties. Those included in the study were vendors of cereals, roots, tubers, pulses and nuts. Both interviews and observations were used to capture information. The information collected included; type of flour product sold, usage, knowledge about nutritional benefits, information given to clients by the vendor about the foods he/she sells, and their perceptions on the mixtures they prepare. A questionnaire was then used to collect data. Data was analyzed using SPSS version 17.

RESULTS

The markets were: Hamisi market, Gambo village market, Luanda market, Mudete market, Mbale market, Chavakali market, Ilungu market and Esibuye markets. A total of 36 vendors were sampled. All the vendors were selling a variety of cereals with the minimum having two types of cereals while others up to five different types of cereals. All the vendors sampled were selling cereals and 88.9% (32) sold millet, 52.8% (19) sold rice, 50% (18) sold maize, 47.2% (17) sold Sorghum while only 13.9% (5) sold wheat. For legumes, 75% were selling beans, 61.1% green grams, 44.4% each had soya and cow peas, 25% simsim and 2.5% French beans. While for nuts, 2.8% each had cashew nuts and peanuts while 66.7% sold groundnuts. For

tubers, those selling cassava were 63.9% (23), Sorghum 47.2% (17), Sweet potato 8.3% (3), Irish potatoes and yams 5.6% (2) each and arrow roots 2.9% (1).

Ninety four percent of the clients tell the vendors the intended use of the foods bought. The main food item made from the products sold is porridge. Other uses include ugali and various preparations for children and adults.

Vendors sold the individual items separately. However, 50% of the vendors prepare flour mixtures for sale to the clients. This flour mixture is used to make porridge for children. The vendors described the processes they used to prepare these flour mixtures. These are:

Wash and dry sorghum and millet in the sun. Sort, then dry fry soya and groundnuts before adding to your cereals and then mill

- Wash the millet to remove dust. Dry the millet and ground nuts in the sun to avoid sticking during milling. Mix millet, soya, groundnuts and omena, dry them together and then for mill
- Mix Soya, groundnuts, millet and cassava. Then mill. Use cassava only for children above two years.
- Mix sorghum, millet, cassava and soya beans after cleaning then mill
- Mix various types of cereals, legumes and roots, pre-cook soya and groundnuts before milling
- Clean sorghum with water if it has sand, then dry, mix with millet, cassava, simsim, groundnuts and Soya beans then mill
- Sieve mixtures then mix sorghum with millet, groundnut and cassava and nuts. If nuts unavailable use soya or beans for porridge. If groundnuts are used, exclude soya since soya and groundnuts solve same purpose
- Clean then mix sorghum, millet, soya, cassava, simsim or groundnuts
- Mix sorghum, millet cassava and amaranth seeds
- Mix millet and sorghum then add cassava
- Mix millet, cassava and maize then mill to make flour
- Clean millet, air it then mix with fried groundnuts and mill
- Mix and grind millet and maize

One vendor said: "mix groundnuts, maize, sorghum and millet. Then mill to make the flour for the porridge. This is good even for a child whose mother died at birth and can be given from birth"

The vendors use different mixtures. These are:

- Millet 1 kg, groundnuts 1 small tin (¼kg),
- Millet 2 kg, Soya ¼, kg, groundnuts ¼ kg, cassava ¼kg.
- Millet 1kg, sorghum ½, soya¼ and dry cassava ½
- 2kg sorghum, ½kg millet, ½kg cassava, ¼kg groundnuts, ¼kg soya,
- 2kg sorghum 1kg millet, 1kg cassava,½ kg groundnuts, 300gms maize.
- 1kg sorghum, ½kg millet, ½kg cassava, maize 300gms
- 1kg millet, ¼kg soya, ¼kg cassava, ¼kg simsim, if you want maize add ½ kg.
- 2kg maize, 1kg millet,½kg cassava for two weeks flour
- 2kg maize, ½kg cassava,½kg maize
- ¼kg cassava, ¼kg millet, ¼, finger millet,¼kg groundnuts, ½kg maize

Among all the vendors, 77.8% indicated that they advice their clients on how to prepare the mixtures, including the proportions to be used, preparation, and ratios for children and adults, In addition they also provide information on what should not be given to the children and also some information on food hygiene and safety.

However, few clients are well informed and know what they want, thus some serve the client accordingly or for those who do not know, they give them information on preparation

Many (91.7%) of the customers using these cereals and flours use it to make porridge for children. Those who admitted having no knowledge about the benefits were 8.3% while 66.7% could mention the benefits of the foods they were selling based on the food groups. The health benefits that they attached to flours included; good for health and improves immunity especially when talking about protein foods. The foods they tell their clients to avoid are black millet and cassava. Black Millet was said to cause diarrhea while cassava was said not to be suitable for children since it causes constipation. They also indicated that sorghum and millet removes poisonous substances from the food.

DISCUSSION

Introduction of complementary food is an important determinant of the nutritional status of children below two years (ICF Macro, 2014). Complementary foods use many different formulations derived from basic agricultural commodities with the key ingredients tending to be maize, wheat, rice and / or millet, along with soybean, cowpea and / or groundnut (Ogumba, 2012).

The main staples in Kenya include roots and tubers, bananas and cereal grains and legume (Oniango *et. al., 2003*). All the vendors sampled were selling cereals. The different types of cereals sold by vendors were; 88.9% sold millet, 52.8% sold rice, 50% sold maize, 47.2% sold Sorghum while only 13.9% sold wheat. The most popular cereal used for porridge is millet (88.9%). This is similar to the countries in West Africa and unlike Congo and Malawi where maize is used (Dop and Benbouzid, 1999). In Kenya, millet flour is used in preparation of porridge or ugali (stiff porridge), while Sorghum is also mixed with cassava and ground into flour. This flour may be mixed with maize or finger millet flour (Oniango *et al.*, 2003) and by six to eight months, 81% of children are already receiving foods made from grains (ICF MACRO, 2010). According to Michaelsen *et al.*, (2009), cereals are the cheapest way to provide energy and they provide 70% or more of the energy intake in low income countries.

Among all the 36 vendors, 75% were selling beans, 61.1% green grams, 44.4% each had soya and cow peas, 25% simsim and 2.5% French beans. Under nuts, 2.8% each had cashew nuts and pea nuts while 66.7% sold groundnuts. More vendors were selling cereals than legumes, pulses and nuts. In Kenya, for all children under three years, the percentage consuming protein-rich foods is 37% (ICF MACRO, 2010).

Those selling cassava were 63.9% (23), Sorghum 47.2% (17), Sweet potato 8.3% (3), Irish potatoes and yams 5.6% each (2) and arrow roots 2.9% (1). Foods made from roots and tubers or from legumes are introduced gradually from 15% of breastfeeding children age 6-8 months up to one-third or more of children 24-35 months old. (ICF MACRO, 2010)

Ninety four percent of the clients inform the vendors the intended use of the foods bought. The main food item made from the products sold is porridge 91.7%. This is the first complementary food that is often given to children similar to the report by Dop and Benbouzid (1999). Children under two years of age require special foods because their teeth are not fully developed to chew tough foods as they adjust gradually from breast milk to semi-solid foods, and ultimately, to foods from the family pot (Treche, 1999).

Vihiga's growing population has put pressure on land leading to subdivisions into uneconomical units (CIDP, 2014). The poverty level is high (42%) (CIDP, 2014) Low-income consumers do not behave differently from other consumers except that the price is of critical importance and functions as a gatekeeper to access (Lutter, 2003); resulting in them purchasing complementary foods from local markets other than use the commercial preparations that may cost more. Majority of the residents of Vihiga County would thus purchase foods for making the porridge for

complementary feeding from the local markets due to the costs. Ultimately, improved food choices will depend on consumer's purchasing capacity (Lopriore and Muehlhoff, 2003).

In Benin and Togo flours for infants are proposed for feeding infants aged 3-6 months, in contradiction with WHO recommendations on infant feeding and may incite mothers to introduce complementary foods too early, before the age of 4 months (Dop and Benbouzid, 1999). In Kenya, foods made from grains are introduced to children by two to three months (31%) (ICF MACRO, 2010). This will lead to inadequate nutrient intake since the food from grains will replace breast milk. One vendor also said, "Mix groundnuts, maize, sorghum and millet. Grind these into porridge and this porridge is suitable for the child whose mother died at birth". Wasting levels are highest for the children in the age groups 6-8 months and 9-11 months (ICF MACRO, 2014). During this period, children are being introduced to complementary food and are more vulnerable to diseases (ICF Macro, 2014).

50% of the vendors prepare flour mixtures for sale to the clients. There is no consistency in information given to clients by the vendors. This entails both the mixtures and the proportions. This would lead to some nutrients being bound and would not be available for utilization by the child's body. Also, the legumes have a long cooking time. These are ground without precooking. Drinking porridge with raw legumes would also have nutritional implications. Therefore, there is a need for capacity building of vendors, access to finance and technological know-how (Lopriore and Muehlhoff, 2003).

CONCLUSION AND RECOMMENDATIONS

During complementary feeding period, the prevalence of malnutrition increases substantially because of increased infections and poor feeding practices (ICF MACRO, 2010). Many complementary foods are purchased as raw commodities or flours in open markets and prepared in homes. In rural areas, women produce mixes at home, using household-produced or locally available inputs (Ogunba, 2012) though the majority of consumers still purchase food products in informal markets. Some consumers come with information already. There is need to educate consumers on updated nutrition education that gives information on nutrients and their importance while pointing out the recommended food sources (Oniango *et. al.*, 2003).

Programs to improve complementary feeding should include approaches for improving access to adequate foods, employing the least demanding resources for their purchase and preparation. They can include technologies that can be applied in the home or community, or larger-scale industrial production of processed and fortified foods. Household technologies such as fermentation, roasting, and malting have been traditionally used in many societies. They can contribute to improving the safety or quality of complementary foods. However, reaching an adequate nutrient level remains a concern, particularly with mainly plant-based diets. (Daelmans *et al.*, 2003)

Most plant based foods i.e. cereals and legumes contain high levels of phytates, which interfere with the bioavailability of micronutrients such as iron, zinc, and calcium (Mensah and Tomkins, 2003). Various traditional processing methods can reduce the phytate content in cereals and legumes (Michaelsen *et. al.*, 2009). Fermentation enhances iron and zinc bioavailability, and also increases the levels of several B vitamins (Dewey and Brown, 2003); it also reduces the phytate content by 90%, depending on the species and pH (Michaelsen *et. al.*, 2009). Soaking of cereals and legumes promotes diffusion of phytate into the soaking water reducing the phytate content in maize by 50% and reducing the phytic content in legume seeds

(peas, peanuts, and pigeon peas) by 20% (Michaelsen *et. al.*, 2009).

Enriching porridges with soaked legumes removes the anti-nutritive factors from legumes and improves nutrient bioavailability (Mensah and Tomkins, 2003). Improving the nutritional quality and microbiological safety of home-prepared complementary foods will improve the nutritional status of young children (Dewey and Brown, 2003). There is therefore, need to educate on the best nutritious food combinations to use when making flour for porridge and also the correct proportions. The information should also include methods and ways of pre-cooking or enhancing nutrient availability.

Advocacy in support of complementary feeding is less passionate and intensive than that for breastfeeding. The role of the private sector in complementary feeding is potentially great.

Complementary feeding is often perceived to be a problem of poverty and limited access to food. It is a family responsibility, not something provided only by the mother for free. It has no natural advocates, no advocacy groups, and no movement to support it (Piwoz*et. al.*, 2003)

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