

Full Length Research Paper

Evaluation of nutritional status of young children aged 0-2 years in the Douala city (Cameroon), survey of some practices during diversification of complementary foods

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Accepted 17 July, 2012

Background: Children, pregnant and lactating mother are the most affected groups by malnutrition in Cameroon. Breast milk is considered as an essential food that enabled the survival of infant, young children and the entire humanity. **The aim:** The aim of this work was to determine the factors that influence the duration of exclusive breastfeeding and complementary feeding (CF) practices. **Methods:** A questionnaire previously developed was submitted to the mothers of 152 children aged 0 – 2 years during nutritional survey in Douala city (Cameroon) to understand breastfeeding and CF practices. **Anthropometrics** measures were taken and statistical analyses were done using Chi² test. **Results:** Low breastfeeding rate 48.67 % ($P < 0.01$) was observed. The frequency of exclusive breastfeeding was 18.67 %. The most frequent complementary foods were cereals and tubers (55.74 %). Early CF was observed in 51.09 % of children between 0-5 months, 4.69 % of children were underweight, 30.47 % stunted and 5.47 % wasted. **Conclusion:** Several diseases related to malnutrition were linked to inappropriate breastfeeding, as proposed by WHO/UNICEF. Mother's education was correlated with good complementary feeding practices.

Keywords: Breastfeeding, Complementary –feeding, malnutrition, children, Cameroon.

INTRODUCTION

Diversification of infant foods defined as a gradual introduction of non dairy food along with the continuation of breast milk in the diet of infants is very important for appropriate growth and optimal health of young children and during adulthood (Benbouzid et al., 1999, UNICEF/WFP/WHO, 2010). However, breastfeeding can be regarded as essential foods that enabled the survival children and humanity (Bellati et al., 1996). The anti-infectious and nutritional benefits of mother's milk are now well known and yet there has been during recent years a decline in breastfeeding because of the presence

on the market of artificial milk formulas (Nlend et al., 1997). Breast milk is the most nutrients source needed and passed infants during the first six months of life (Bond et al., 2004). The period from six to twenty months is a crucial time in the infant feeding because it is at this delicate moment that significant eating disorders begins to appear (Clark et al., 2002). UNICEF and other NGOs reported that the opportunity window of tackling Infant and children malnutrition is -9 months to +24 months (UNICEF/WFP/WHO, 2010).

Nutritional status and health status of infants and young children is linked to that of their mother. Healthy mothers give birth to healthy children, whereas, malnourish mothers give birth to unhealthy babies and the situation is transmitted from generation to generations (Subarnalata et al., 2006).

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Table 1. Distribution of enrolled children by sex and age

Age (Months)	Distribution by gender of Survey					
	Girls		Boys		Total	
	Number	%	Number	%	Number	%
0-12	44	29.33	46	30.67	90	60
13-24	36	24.00	24	16.00	60	40
Total	80	53.33	70	46.67	150	100

%= percentage

The preschool children are a particularly vulnerable group to malnutrition in Cameroon as well as in other developing countries (Garba et al., 2001 UNICEF, 2011). WHO published in 1998 that the nutritional status of young children reflects that of the population. Hence, the need to pay particular attention to their diet from birth is crucial. Malnutrition in children then expressed the general status of malnutrition of the population (WHO, 1998). A significant portion of the population is subject to nutritional problems that affect the development of children their intellectual development and heir health and work performance in adulthood (Kuate-Defo, 2001). The consequences are a negative effect on psychomotor development, intellectual or infant growth that may increase poverty during their life cycle (De Benoist, 1999; Okoroigwe and Okeke, 2009).

Although several studies reports on the association between nutritional and health status of preschool children in Cameroon (Kana Sop, 2000; Garba et al., 2001, Kana Sop et al., 2011) and very few exists that explain optimal complementary feeding practices in these children. Malnutrition rate have been increasing in Cameroon for the last three decades (Lowe et al. 1993; RC, 2000; ESDC, 2004) However, Cameroon has food self-sufficiency through its biodiversity, but the eating habits of the population do not always promote a balanced diet (Kuate-Defo, 2001). This is often observed when the child lives in an environment where there is no food sufficiency, hygiene conditions are poor, access to primary health care is low, and that education of mother is often inappropriate or insufficient for a successful complementary feeding (Kana Sop et al., 2011). Food and nutrition insecurity due to poor access to animal food sources and low fruit and vegetable intakes have increased the risk of not attaining millennium development goals in Cameroon at the target 2015 (SCN, 2004). To optimize children growth and prevent intellectual capacity losses at youngest ages, local complementary feeding base local available foods modification and diversification are needed for each ages (Santika et al., 2009).

As part of nutritional monitoring and improving the health status of all Cameroonians, the objective of this work is to illuminate more specific causes of child

malnutrition including those related to breastfeeding and complementary feeding.

MATERIALS AND METHODS

Our survey was conducted in seven districts and neighbor wood of Douala city: Akwa, Akwa-Nord, Bepanda, Bonaberi, Cité Sic, Deido an Ndogbong. The sample characteristics are summarized in the table below.

We conducted a nutritional survey that enrolled 152 children aged 0-2 years of both sexes during the period from 09 April to 20 May 2010. For basic information on infants, a simplified questionnaire was designed to have information on age, height, weight children, taboos; foods consumed the previous day, the number of meals and the mode of feeding.

Analysis of the results was done by calculating Z-scores and performed with the Nutrisurvey.de software 2007. Chi² test was used for a significance level P <0.01. Results were expressed as percentages, means \pm standard deviations of the mean.

RESULTS AND DISCUSSIONS

It appeared from our survey that, the prevalence of breastfeeding was 48.67% with 18.67% for exclusive breastfeeding; 2.67% for artificial feeding, and 27.33% for mixed breastfeeding. We noted a decline in the practice of breastfeeding (table 1). This is particularly due to urbanization and behavior changes as previously reported (Bellati et al., 1996). On the other hand, exclusive breastfeeding was little or poorly known or practiced. There was a tendency to introduce early complementary foods in the diet of the children because the mothers believed that their milk was not sufficient spoiled or they believe to calm a baby who cries a lot. Working mothers in urban areas were away from their offspring for several hours during day and found it compulsory to introduce complementary foods early (Bloomfield, 2011). The recipes used by mothers in this study would surely lead to malnutrition. However, some

Table 2. Preschool children breastfeeding practices by age

Age slices (months)	Breastfeeding			Total
	Maternal N (%)	Artificial N (%)	Mixed N (%)	
0-5	7 (4.67)	0 (0.00)	11 (7.33)	18 (12.00)
6-12	19 (12.67)	3 (2.00)	27 (18.00)	49 (32.67)
13-24	2 (1.33)	1 (0.67)	3 (2.00)	6 (4.00)
Total	28 (18.67%)	4 (2.67)	41 (27.33)	73 (48.67)

N(%)= Number(percentage)

of the available resources identified during the survey made up of legumes (soyam, peanuts, dry fish) tubers (yellos sweet potatoes, avocado, eggs) very poorly used could be well combined and diversified to improve nutrient intakes of children to link food security to nutrition security like previously reported by other authors (Tontisirin and Bhattacharjee, 2008).

These figures were similar to those of EDSC (Survey Demographic Health Cameroon, 2004) surveys that were conducted under similar conditions but for children of 0-59 months. However, it is reported that malnutrition is very harmful in the interval minus 9 months to plus 24 months and most of the consequences are irreversible and will negatively influence, physical, psychomotor and intellectual growth of children till their adulthood, impairing their schooling performance and economic productivity. There was a decrease of values compared to those obtained during EDSC in 1991 and 1998 in the cities of Douala and Yaoundé, no matter all the effort that the Cameroon Government have been making to improve breastfeeding. In 1991 and 1998, 95.4 % of children were breastfed and the median duration of breastfeeding increased from 13.8 months to 14.1 months from 1991 to 1998. In a study reported by Kana Sop et al. (2011) in a rural community of the Western Province of Cameroon, maternal breastfeeding comprising breast milk and water, but no semi solid or solid food feeding was practiced at 98.8%. It was observed that most babies were exclusively breastfed. This was linked to habit and to the high cost of manufactured milk for families living in this rural area. The percentages of children breastfed at 12 months in Yaoundé, Bangang, Bassessa and Ngaoundéré were respectively 63.46%, 55.81% and 63.04% (Kana Sop, 2000). The following table 3 presents the frequency of consumption of the main complementary foods identified during the nutrition survey.

This table shows that most children consume plenty of water (94.26%), tubers (55.74%), fishes (50%) and corn porridge fortified with soy or not (34.43%), the baby industrial milk formulas (38.52%) and cakes (38.52%). Kana Sop et al. (2011) noted that 43% of children started

complementary feeding before the age of 6 months using principally maize gruel and Irish potatoes puree, whereas, 49% of them started it after the age of 6 months and was exposed to malnutrition in all the forms. In that study, only 8% of infants started complementary feeding at 6 months as recommended (UNICEF/WFP/WHO, 2010). The findings indicated a crucial problem of inappropriate complementary feeding which was not optimal, and which was either too late or too early as indicated previously. The main foods were: Corn Gruel (CG); Corn gruel + fresh milk (CGM), Corn gruel + fresh milk + lime juice (CGML), Irish potato with eggs and fresh fish (PEF), Simple Irish potato (P), Roasted Irish Potato (RP), Irish potato pounded with pre-boiled red beans(PB), Maize paste(MP), Maize paste and okro sauce (MPO), Sweet potato and Avocado(SPA) and Ripe Banana (RB). They were traditional and mostly indigenous. However, it was noted that complementary foods were cooked once a day and given monotonously with poor hygienic care. Even if they were indigenous they were cooked in inappropriate ways and could not supply the nutrients needs of children. In this study, most of the reported foods were transformed with more varieties, but were not appropriately modified and diversified for optimal nutrients intakes.

We observed reduced growth rates from health report cards and believed it was linked to improper complementary foods, poor feeding practices expressed by early and late.

It is observed that majority of complementary food (more than 51%) was introduced before 6 months of age. Only 25.55 % of children appropriately started complementary feeding at 6 months, while after 6 month more than 23.36% were still not on complementary feeding. From these data it is easy to observe that more than 75% of children are inappropriately put on complementary feeding (early, 51.09 % and late 23.36%). These results are similar to those reported by Kana Sop in 2000.

The frequencies of the age of introduction of foods were respectively for age groups 0-5 months, ≥ 6 months

Table 3. Common ten most frequent complementary foods and consumption frequency

Food	frequency	Percentages (%)
Water	115	94.26
Tubers and bananas	68	55.74
Fishes	61	50.00
Industrials milk for baby	47	38.52
Bread and cake	47	38.52
Maize and soya gruels	42	34.43
Butter, chocolate, margarine	42	34.43
Eggs	37	30.33
Meat	31	25.41
Milk products	28	22.06
Couscous of maize or manioc	25	20.49
Vitamins, drugs	24	19.67
Natural Fruits Juice	23	18.85
Rice	22	19.67
Sweet carbonated drinking	8	6.56
Biscuits	5	4.10
Herbal tea	3	2.46

Table 4. Age of introduction of complementary foods

Age slice	Age	Complementary foods introduction		
		Before 6 months	6 months	After 6 months
Number	Total	70	35	32
Percentage (%)		51.09	25.55	23.36
Total		137 (100%)		

Table 5. Distribution of most common diseases at the time of the survey

Frequent diseases	Malaria and fever	Diarrhea	vomiting	Intestinal Parasitose	Others diseases
Number	23	16	4	2	51
Percentage (%)	24	16.7	4.01	2.08	53.12

and 7 months from 56.72 % to 19.24 % and 24.04 % in Yaoundé in 2000 (Kana, 2000). The mothers seem to introduce an identical manner food in the diet of infants in Douala and Yaoundé. The practice seems the same in major cities, because mothers are occupied by the same duties. This means that food habit and complementary feeding practices have not changed a lot during years. This may be due to the fact that, no national or local complementary feeding guides lines are available to help

the mothers that may wish to follow breastfeeding recommendations.

Table 5 present some of the frequent illness reported during the survey. It is observed in Table 5 that 24.24 % of children had malaria or developed a high fever. Among the diseases caused by poor nutrition, diarrheas exhibit the highest rate. The major reasons for these illnesses include the relatively low standard of living of some households, hygiene and the questionable quality of

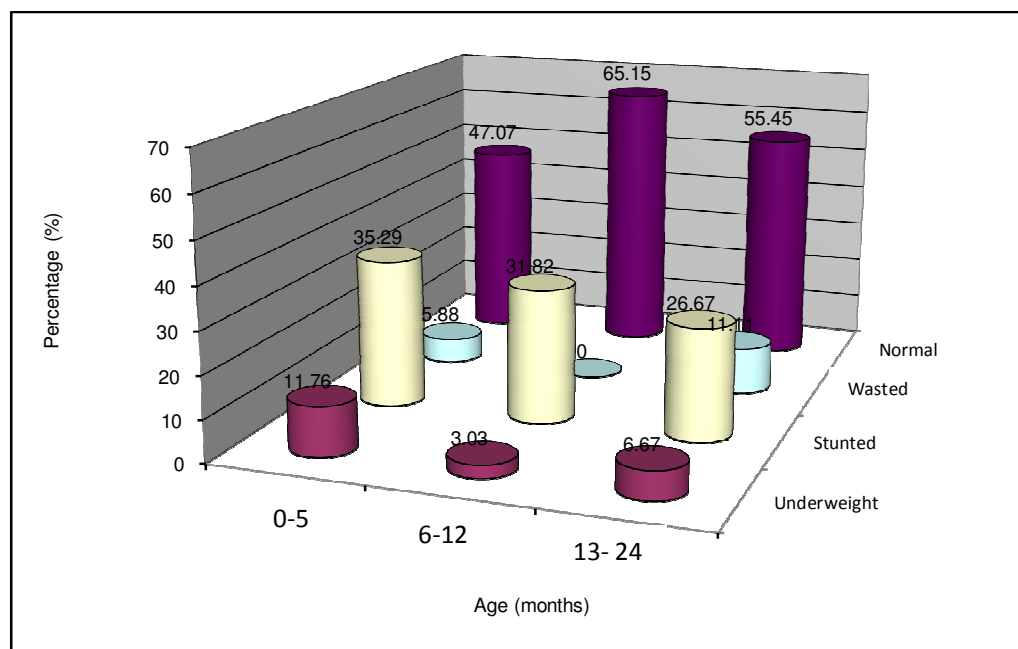


Figure 1. Malnutrition parameters according to age

drinking water and water used for food preparation, early cessation of breastfeeding while it remains important for protecting the body of the child against infections (Delpeuch and Dop, 1999).

From the figure 1 highest percentage of stunting was observed between 0 and 5 month, indicating intrauterine growth retardation and probably inappropriate breastfeeding and complementary practices. These percentages decreased between 5 and 24 months were they remained high. Those figures are comparable to those reported in Cameroon profile 2010. In that Cameroon profile 2010 very poor nutritional status in children less than 59 months was observed, based on two sources: the WHO Child Growth Standard and the NHCS Reference Population, because there are no Cameroon national standards with respectively, stunting at 36 % & 30 % (average 33 %); underweight at 16 % & 19 % (average 17.5 %); wasting at 7 & 6% (average 6.5 %), and the total average estimation of both sources for poor nutritional status at 55 % (NHCS) to 59 % (WHO) with the average of 57 % for both sources (Cameroon Profile, 2010).

An analysis with the threshold -3 Z-score for these three parameters showed that 3.13% of children were severely wasted, 14.84% severely stunted, and only 0.78% severely underweight.

Wasting rates and stunting observed in Douala were comparable to those of previous national surveys (RUC,

1991; EDSC, 1998, ESDC 2004). They were respectively 09.6%, 5.1% and 6.8% for RUC 1991, EDSC 1998 and ESDC 2004. According to a WHO report (1989), high rates of malnutrition are due to the facts that mothers who breastfeed their children for six months do not exclusively, the body of the child may suffer attacks that make nutritional risk for dehydration (Beck et al., 2010). Furthermore, it was easy to have knowledge on the use of baby milk, because children who are fed may receive the nutrients they need in small quantities if the food is much diluted. Also is well known that in children less than 6 months fed (AED / USAID, 1997 and 1999), there is strong competition between the nutrients provided by breast milk and complementary foods by making low intake of milk mineral breast. Young women of childbearing age, pregnant or nursing may be undernourished and transmit states of malnutrition to their babies at birth, by uterine growth retardation (Sowden et al., 2009). According to Diouf et al., (2000), a good complementary feeding at six months is useful to improve the nutritional status of children. It helps to reduce the prevalences the onset of the three form of nutrient energy malnutrition if no other factor influenced health and if the necessary needed foods are available in the local markets of the city. Just a few diseases will put the child in a more severe malnutrition (kwashiorkor or marasmus). Consumption of animal products reduces the rate of malnutrition and it is benefit for children. Those

animal foods comprising fish, meat, eggs and milk were not really consumed in enough amounts to cover the needs of the children as well as those of the entire population. Such foods are indeed good sources of protein and minerals such as iron in its hem form and also of calcium. Legumes like soybeans offer many nutritional benefits. Recommended daily intake of soy or not combined with cereals to prevent disease protein and energy (Jallila et al., 2002).

CONCLUSION

The practice of exclusive breastfeeding was very low with inappropriate complementary feeding in very poor hygienic environment. However, we know that, as those young children did not receive sufficient breast milk and its protective effects they were particularly vulnerable to diarrhea, acute respiratory infections and malnutrition. Stunting in many children indicated poor children growth linked to longtime exposure to malnutrition, illness and poor hygienic environment as observed. We recommended that mothers, medical and government authorities continue breastfeeding from the first day and improve complementary feeding practices of infants and young children from 6 months, until the second year. They should associate proper nutritional management of childhood diseases and increased food during recovery from acute infections, promotion of appropriate feeding and micronutrient supplementation for women of child bearing age to prevent intrauterine growth retardation.

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