



Received: 15-03-2023
Accepted: 25-04-2023

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Knowledge, Attitude and Practice Regarding Complementary Feeding in Cameroon

¹ Pascal Tobit, ² Christine Deborah Ngo Tang, ³ Marie Modestine Kana Sop, ⁴ Marlyse Solange Leng, ⁵ Robert Ndjouenkeu

^{1, 2, 3, 4} Department of Biochemistry, University of Douala, Douala, Cameroon

⁵ Department of Food Sciences and Nutrition, University of Ngaoundéré, Ngaoundéré, Cameroon

Corresponding Author: **Pascal Tobit**

Abstract

This study was undertaken to access the knowledge, attitude and practice (KAP) regarding complementary feeding in Cameroon. The target population for the KAP evaluation was mothers of children aged between 01 to 18 months living in different quarters of the 6 districts of Douala the city. A cross sectional survey was conducted in a representative sampling. Two-degree sampling was used in this survey and 102 randomly selected mothers of children from the six districts the city were selected according to Fisher's formula. An attempt was also made to produce weaning flour with participants using the most use food items. The nutritional composition was access using standard methods and compare with standards. The sensory evaluation of porridges produce from weaning flours was also access. Results show that mothers of children are young

and their children are in food transition period aged between 01 to 18 months. Most of mothers are unemployed and come from the west region of Cameroon. They are literate in majority without any cultural prohibition. Nevertheless, they have low socioeconomics levels. Only few of them have knowledge about weaning practices and the WHO recommendations regarding weaning feeding. Corn, potato, soybeans, groundnut, carrot, orange, egg shell and dry fish are the most food items use in weaning practices. Complementary flours produce fulfilled standards for some macronutrients but not for others. The gross energy values are closer to standards. Porridges prepare from weaning flours was appreciated by mothers who accept to change attitude by indicating that they would feed these porridge to their children.

Keywords: Knowledge, Attitude, Feeding, Cameroon

Introduction

Childhood malnutrition is a public threat cause by inadequate intake of food. It can be due to inaccessibility of food, or inadequate diet. Recommended childhood malnutrition prevention and control include providing adequate meal and optimal health care for those with clinical sign. Adequate nutrition may be use as complementary to supplement the energy intake gap need for a breastfed child. Complementary food has demonstrated a protective effectiveness in clinical trial. Authors recognized the potential of local foods to improve the nutrient quality of their diets ^[1]. It has been point out the importance of local knowledge and practice in complementary feeding interventions ^[2, 3]. Many foods items are use in complementary feeding practices in Cameroon and it is belief to help in childhood malnutrition management. Although it is known that combination of several local foodstuffs could help improve the quality of infant diets in low-income and middle-income countries ^[4, 3]. The problem remains the bulkiness and the nutritional inadequacy of the meal generally in the form of porridge ^[3]. To overcome this, a survey was undertaken to have knowledge of food items used in complementary feeding practice in Cameroon. Information collected through this program will be helpful in educating and formulating low cost and balanced diet which may be used at household level. The intended used of the survey findings is to develop suitable strategies that would contribute in improving the nutrient adequacy of infant and young child (IYC) diets in Cameroon by formulating a novel weaning foods made from an optimal combination of food items in the prevention and control of childhood malnutrition. The specific objectives are to:

1. Access the knowledge, attitude and practice (KAP) regarding complementary feeding in Cameroon.
2. Produce balance weaning foods from locally available food items.
3. Access attitudes of mother towards changing in regard to porridge consumption.

Methods

Survey

Part 1 of the survey consisted in recruiting participants in the study. The target population for the KAP evaluation was mothers of children aged between 01 to 18 months living in different quarters of the 6 districts of Douala city. Part 2 of the study consisted in formulating with mothers balance weaning flours by using the most popular food items utilize

in weaning practice. Part 3 consisted in accessing attitude of mother towards changing by evaluating weaning porridges produce using rating scale model procedures.

Part 1: Survey Population

1.1 Survey Design

A cross sectional survey was conducted in a representative sampling of mothers.

Table 1: Subdivision of Douala city, number of neighborhoods, inhabitants and percentage representative

Subdivision	Number of neighborhoods	Number of inhabitants	Percentage representative (%)	Number of mothers to be interviewed
Douala I	32	223210	11.7	12
Douala II	30	261407	13.7	14
Douala III	104	641071	33.6	34
Douala IV	19	242821	12.7	13
Douala V	54	538449	28	28
Douala VI	5	5464	0.3	1
Total	244	1913422	100	102

Sources: ^[5]

1.2 Sampling Plan

Two degree sampling was used in this survey. The city of Douala has six subdivisions and the number of neighborhoods to be surveyed was first selected at random from the identified neighborhoods obtained from the Douala council. 102 randomly selected mothers of children from the six districts of the Douala city were selected according to Fisher's formula which takes into account the total number of inhabitants of the city. The number of mother to be interviewed per subdivision was determined then after by the method of quota according to the density of the population. The six (06) subdivisions of Douala city, their different neighborhoods, the number of inhabitants and their percentage representative are shown in Table 1 ^[5].

1.3 Data Collection

Data collection was conducted using a standardized questionnaire. The questionnaire was based on demographic and socio economical characterization; knowledge, attitude and practice regarding complementary feeding in Cameroon. All data was collected by trained project personnel. Data collected was monitored and reviewed daily by a team supervisor.

Part 2: Formulation of a Balance Weaning Food

2.1 Materials

Maize (*Zea mays*), soybeans (*Glycine max*), groundnut (*Arachis hypogaea*), egg (*Gallus gallus domesticus*), carrot (*Daucus carota subsp*) were selected among the food items locally used. They were purchased from local market in Douala city, Cameroon. *Dioscorea schimperiana* is an endangered yam species and was choosing to diversify its end uses limited to pounded yam. Dried yam slices were bought in Baham local market, in the west region of Cameroon. Yam samples were collected in bamboo bags and transported to the laboratory. All the samples were kept at room temperature before processing.

2.2 Processing Technologies

Raw materials were manually sorted to remove impurities. Groundnuts were toasted. Soybeans were completely dehulled and roasted over low heat during 20 min to reduce fibers and antinutrients. Groundnuts and maize were subsequently crushed, varnished and grind. Eggs shells were

washed with tap water, boiled for 20 min in hot water before drying. Carrot was sized and cut into 0.5 cm thick slices before drying. Maize sample was used to produce germinated maize as sources of alpha amylase to increase the nutrient density of the food. Germination was carried out according to the technique described by Ariahu *et al.* ^[6]. Samples (except dried yam) were dried at 45 ± 5 °C in a cross flow cabinet dryer (Binder, FDL 115) to a moisture content less than 10%. All dried samples were ground into fine flour using a (Cullati) hammer mill (germinated maize and soybeans) or a robot blender (Moulinex) (groundnut, carrot, egg shell). Dried yam slices were grounded in a milling machine (Retsch ZM 200) equipped with a 1 mm sieve. Flour was then sieved through a sieve of 500 µm, packaged in an air tight polyethylene bags and stored at -18 °C until chemical analyses were conducted.

2.3 Formulation of Yam and Maize Based Complementary Foods

A proportion of 50% of yam or maize flours (carbohydrates sources); 7% of groundnuts (lipids sources) 22% of soybeans (protein source) was used in formulating a balance weaning flours. These proportions take into account the recommended nutritional allowances. To reduce the bulkiness, germinated maize (6%) was added to the mixture. Ingredients were mixed, packaged in an air tight polyethylene bags and stored at -18 °C until chemical analyses were conducted.

Part 3: Sensory Evaluation of the Weaning Porridge

Weaning flour (100g) was stirred in 300ml of water before introduction in a pot containing 800ml of boiling water. The mixture was stirred and allows cooking 10 to 15min and cool. Panelists were made up of thirteen mothers. They were asked to evaluate the porridge for the following sensory attributes on a 9-point Hedonic scale; consistency, flavor, appearance, mouth feel, sweetness, and overall acceptability (1 = dislike extremely, 5 = neither like nor dislike, 9 = like extremely) ^[7]. The attitudes of mother were tested by asking whether they would feed any of the porridges to their child.

Data Analysis

Descriptive analysis to access knowledge, attitude and practice regarding complementary feeding was used.

Microsoft Office EXCEL 2007 via Microsoft Office WORD 2007 was used as software data management.

Chemical Analysis

Proximate Composition

Moisture and ash were determined by AOAC [8] method. Crude protein was analyzed according to Kjeldahl method [8]. Total fat content was quantified according to Weibull-Stoldt method [9]. Total dietary fiber was analyzed according to the AOAC (2000) method [8].

Results and Discussion

Part 1: Survey Population

1.1 Socio-Economic Status Characteristics of Actors

Distribution of mothers according to their age is presented in table 2. A total of 102 women were included in the study. The statistical analysis carried out reveals that 56% of mothers are between 20 and 30 years old and 28% are between 30 and 40 years old; 11% of mothers are between 40 and 50 years old and 5% have an age range varying between 50 and 60 years. In summary, 88% of mothers are aged under 40 years and 16% aged between 40 and 60. These mothers have children in food transition period aged between 01 to 18 months (100%).

Table 2: Distribution of mother's ages

Ages (Year)	Numbers	Percentages (%)
20- 30	57	56
30- 40	29	28
40 -50	11	11
50- 60	5	5
Total	102	100

Table 3: Distribution of children's ages

Ages (months)	Numbers of children	Percentage (%)
0- 5	18	17
5- 10	56	55
10 -15	26	26
15- 20	2	2
Total	102	100

Analysis of the survey responses also shows that 45% of mothers have a job and 55% of them are unemployed. 50% of mothers are married. None of them (100%) has any cultural food prohibitions. The majority of mothers (50%) come from the West region of Cameroon and 85% of mothers have low socioeconomic levels. Statistics show that 10% of mothers are illiterate and 34% have less than 3

children in charge. Distribution of children according to their age is presented in table 3. Most children (55%) are between the ages of 5 to 10 months. 26% of them are between the ages of 10 and 15 months and 17% between 0 and 5 months. A minority of children (2%) are between 15 and 20 months old.

1.2 Knowledge of Mothers Regarding Weaning Feeding

Questionnaire responses analysis shows that 26% of mothers have knowledge about weaning practices and the WHO recommendations regarding age at which a complementary food should be introduced into an infant diet [10]. The population in study used hospital, radio and television as a means of information.

1.3 Weaning Food Practice

Mothers (26%) begin to introduce weaning foods diet from the age of 6 months which is in accordance with WHO recommendations [10]. Among cereal, corn (72%) is the most used followed by rice (12%), wheat (5%) and millet (1%). Potato (7%) is the most used tubers followed by sweet potato and cocoyam (1% the both). Corn and potato are generally used as carbohydrates sources. Soybeans (71%) and peanuts (21%) are the most used leguminous followed by beans (3%). They are generally used as protein and lipids sources. Carrot (13%) is the most used vegetable followed by green bean (2%) and vegetable named "folong" (2%). Orange (62%) is the most used fruit followed by banana (25%), papaya (22%), pineapple (3%), tomato (2%) and watermelon (1%). Vegetables and fruits are generally used as vitamin and mineral sources. Among manufactured product, powdered milk (29%) is the most widely used, followed by yogurt (8%), biscuits (6%), spaghetti (4%) and some industrial infant flours (Cerelac (7%), phosphatine (6%), Bledina (3%)). As animal products, dry fish is the most widely used in weaning practices, followed by chicken egg shells (6%), chicken eggs (4%), shrimps (3%) and meat (2%). They are generally used as protein source. Egg shells (hens) are usually used by some inhabitants as a mineral supplement in the form of powder [11].

1.4 Frequencies of Utilization of Different Foods

Frequencies of consumption of different food items are presented in table 4. It appears from table 4 that leguminous (93%) are the food items mostly used in weaning food practices, followed by cereals (88%), manufactured products (62%), animal's products (23%), vegetables (17%) and tubers (9%).

Table 4: Frequency of consumption of different food items

Foods	Cereals (%)	Tubers (%)	Leguminous (%)	Vegetable (%)	Manufactured products (%)	Animal's products (%)
Frequencies	88	9	93	17	62	23

Part 2: Nutritional Composition of the Weaning Flour

The nutritional composition of the weaning flours is presented in table 5. Moisture (8.93%) and carbohydrates (64.81%) content of the yam composite flour is the highest while protein (16.04%) and lipids (11.64) content of the

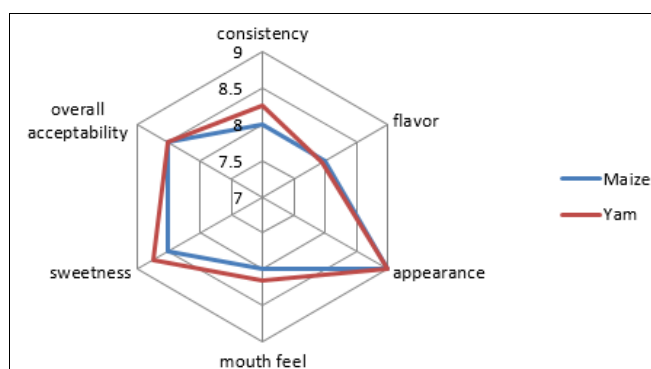
maize formula are the highest. Ash and carbohydrates content of the two formulas respect the FAO standards while lipids, fibers and moisture content are higher. Protein content of the maize formula respects the standards. The gross energy of the yam formula respects the standards.

Table 5: Nutritional composition of the optimized maize-based formulation

	Maize	Yam	FAO/WHO[12]
Proximate analysis			
Moisture (%)	6.58	8.84	5
Ash (%)	4.10	4.70	< 5.00
Protein (%)	16.34	14.96	13 à 15%
Lipids (%)	11.75	9.42	2.00
Carbohydrates (%)	63.94	64.81	60 to 75
Fibers (%)	5.45	6.58	< 5.00
Gross energy (Kcal/100g)	426.87	403.86	400Kcal/100g

Sensory Evaluation of the Weaning Porridge

The results of sensory evaluation score of maize and yam-based porridge are presented in figure 1. No significant ($p \geq .05$) differences between the two porridges were noted by panelists for all attributes. Based on sensory scores (8 to 9), all porridge samples were acceptable. The thirty panelists indicated that they would feed these porridges to their child.

**Fig 1:** Sensory evaluation score of maize and yam-based porridge

This study was undertaken to assess the knowledge, attitude and practice (KAP) regarding complementary feeding in Cameroon. Mothers in this survey are young (84%). Tchimou *et al.*,^[13] reported the same observation (92% of young mothers, aged over 20). Low economic level characterizes mothers (60%) in this study. Rasheed *et al.*,^[2] reported a high level of weaning women ranging from age 30-45 years. The percentage observed is higher than the value (49.09%) reported by^[14]. Illiteracy mother percentage (10%) recorded in this study is lower than the value (49%) reported by^[15] and by^[14] in a survey study conducted in Marrakech and Agadir (Morocco). 45% of mothers have a job. This result is closer to 50% reported by^[2]. The distribution percentage of food items use in weaning practice cereals (corn (72%), rice (12%) and millet (1%)), fruits (orange (62%), banana (25%) and papaya (22%)), vegetable (carrot (13%)) and animal products (fish (8%), meat (2%) and eggs (4%)) is different to values (maize (50%), rice (64%) and millet (74%)), fruits (orange (66%), banana (22%) and papaya (30%)), vegetable (carrot (31%)) and animal products (fish (83%), meat (43%) and egg (67%)) reported by^[16] during a survey on knowledge and practices of mothers of children from 06 to 18 months at the general hospital of Marcory in Ivory coast. The frequency of consumption of different foods items (93% of legumes, 88% of cereals, 9% of tubers and 17% of vegetables) recorded in this study is different from the distribution values (19.6% legumes, 91.6% cereals, 71.5% tubers and 78.2% vegetables) reported by^[17] in a survey study in urban Congo. An attempt was made to produce weaning flour

from the most use food items. Weaning flours fulfilled standards for some macronutrients but not for others. The gross energy value is closer to standards. A well-structured study need to be undertaken in order to have complementary flours respecting all the standards in terms of micro and micronutrients. Nevertheless, porridges prepare from weaning flours was appreciated by mothers. Changing in attitude was perceived since all mothers indicated that they would feed these porridges to their child.

Conclusion

Mothers of children are young and their children are in food transition period aged between 01 to 18 months. Most of mothers are unemployed and come from the west region of Cameroon. They are literate in majority without any cultural prohibition. Nevertheless, they have low socioeconomics levels. Only few of them have knowledge about weaning practices and the WHO recommendations regarding weaning feeding. Corn, potato, soybeans, groundnut, carrot, orange, egg shell and dry fish are the most food items use in weaning practices. Complementary flours produce from the most use food items fulfilled standards for some macronutrients but not for others. The gross energy value is closer to standards. Porridges prepare from weaning flours was appreciated by mothers who accept to change attitude by indicating that they would feed these porridge to their children.

References

1. Tumilowicz A, McClafferty B, Neufeld ML, Hotz C, Pelto HG. Using implementation research for evidence-based programme development: A case study from Kenya. *Maternal & Child Nutrition*. 2016; 11(Suppl.3):1-5.
2. Rasheed Y, Rizwan B, Noor F, Khanum F, Shahid M, Munawar S. Assessment of Knowledge Regarding Weaning Practices among Mothers of Gulab Devi Educational Complex. *Pakistan Journal of Health Sciences*. 2022; 3(4). <https://thejas.com.pk/index.php/pjhs>
3. Ganganahalli P, Patil SD, Yankanchi S, Tellur L. Study of pattern of foods given to the infants during weaning period in an urban field practice area in Vijayapura. *J Family Med Prim Care*. 2022; 11:6143-6146.
4. Ibeanu VN. Proximate composition, sensory properties and acceptability of low viscous complementary gruels based on local staples, *Nigeria Journal of Nutritional Science*. 2009; 30(1):103-111.
5. INS/BUCREP: Bureau Central des Recensements et des Etudes de la Population, Etat et structures de la population de Douala, 2005, p25.
6. Ariahu CC, Ukpabi U, Mbajunwa KO. Production of African Breadfruit (*Treculia Africana*) and Soya bean (*Glycine max*) based food formulations, 1: Effects of germination and fermentation on nutritional and organoleptic quality, *Plant Foods Hum Nutr*. 1999; 54:123-266.
7. Makafui Borbi A, Dolan Kirk D, Siddiq M, Hooper S, Sami A. Development and quality evaluation of banana-rice-bean porridge as weaning food for older infants and young children. *Legume Science*. 2020; 2:e41:1-9. Doi: <https://doi.org/10.1002/leg3.41>
8. AOAC (Association of Official Analytical Chemists), *Official Methods of Analysis of AOAC, International*,

- 17th Edition. Washington, DC, USA, 2000.
9. Kolar K, Faure U, Torelm I, Finglas P. An intercomparison of methods for the determination of total fat in a meat reference material. *Fresenius Journal of Analytical Chemistry*. 1993; 347(10):393-395.
 10. WHO (Organisation Mondiale de la Santé), Santé et développement de l'enfant et de l'adolescent. «Alimentation de complément», 2010, p45.
 11. Domingo D. *La Maison Abc Vos Ig; les atouts de l'œuf*, 2015, p38.
 12. FAO/OMS Programme mixte FAO/OMS sur les normes alimentaires. Commission du Codex Alimentarius, 32ème session Rome (Italie), 29 juin-4 juillet 2009. Rapport de la 30ème session du comité du codex sur la nutrition et les aliments diététiques ou de régime. Le Cap (Afrique du Sud) 3-7 Novembre 2008, 2009, 221-223.
 13. Tchimou A, Mdaghri AA, El Harim EML, Lamdouar BN. La diversification alimentaire (D.A) d'après une enquête menée au centre de néonatalogie du CHU de Rabat, *Médecine du Maghreb*. 2001; 86:4.
 14. Bellati-Saadi F, Sall MG, Martin SL, Azondekon A, Kuakivi N. Situation actuelle de l'allaitement maternel dans la région d'Agadir au Maroc. A propos d'une enquête chez 220 mères. *Médecine d'Afrique Noire*. 1996, 43(4):194-196.
 15. Roida S, Hassi A, Maoulainine FM, Aboussad A. Les pratiques de l'allaitement maternel à la maternité Universitaire de Marrakech (Maroc). *Journal de pédiatrie et de puéricultrice*, 2010, p4.
 16. Azagoh-Kouadio RC. Connaissances et pratiques des mères d'enfants de 6 à 18 mois relatives à la conduite du sevrage: Cas de l'hôpital général de Marcory (Cote d'Ivoire). 2013; 4:4.
 17. Cornu A, Trèche S, Massamba JP, Delpeuch F. Alimentation de sevrage et interventions nutritionnelles au Congo. *Cahiers Santé*. 1993; 3:168-177.