



SEMINAR ON NUTRITIONAL PROBLEMS  
IN THE WEANING PERIOD

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THE APPLIED NUTRITION PROGRAMME IN SUDAN  
WITH PARTICULAR REFERENCE TO WEANING NUTRITION

by

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1. Background information

Sudan is a Republic of one million square miles and approximately fifteen million people of several ethnical groups with their own socio-cultural, economical, etc., patterns and traditional ways of life. Geographically it has desert, semi-desert and tropical forest areas, and administratively it is divided into nine provinces.

The Government of the Sudan for a long time has been aware of the presence of nutrition problems that affect the health of the population and has devoted efforts to the study and solution of these problems. Realizing the importance and magnitude of nutrition problems the Government requested assistance from WHO, FAO and UNICEF for the implementation of an Applied Nutrition Programme (ANP).

2. The ANP started in 1966 and in brief its main long and short-term objectives are:

2.1 Long-term and general

2.1.1 To improve the nutritional status of the population by all possible means.

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- 2.1.2 To strengthen, expand, coordinate and integrate within the Government services all food and nutrition activities carried out by different Government departments, with special emphasis on curing and preventing malnutrition and promoting good health.
- 2.1.3 To establish, develop, implement and coordinate a unified policy on nutrition education and training using all possible channels and to develop suitable teaching materials to be used in the ANP.
- 2.1.4 To establish a Statutory National Food and Nutrition Committee (NFNC).
- 2.1.5 To develop protein rich food mixtures to be used in supplementary feeding as a weaning food.
- 2.1.6 To strengthen and expand the nutrition services of the Ministry of Health.
- 2.1.7 To produce a national food composition table and to set up national standards of nutrients and other biochemical substances in body fluids.
- 2.1.8 To prepare annual food balance sheets.
- 2.1.9 To evaluate periodically the progress of the ANP.

## 2.2 Short-term

- 2.2.1 To establish a Technical Advisory Committee on Applied Nutrition (TACAN) formed by senior technical officers of the Government departments concerned (policy making body).
- 2.2.2 To conduct surveys (all types) in the fields of food and nutrition, socio-anthropology, etc., in order to provide base-line data to study the problems and for implementation of projects.

2.2.3 To strengthen and improve the teaching of nutrition in the:

- a) Faculties concerned of the University of Khartoum (Medicine, Agriculture, Veterinary, etc.).
- b) Schools of nursing, health visitors, midwives, health inspectors, home-economics, teachers' training institutes, etc.
- c) In-service training courses given to officers of the Government and other agencies directly or indirectly engaged in food and nutrition activities.

2.2.4 To establish and develop a demonstration and training area in applied nutrition.

2.2.5 To implement specific projects to deal with the food and nutrition problems found .

### 3. Activities of the ANP

The ANP of Sudan deals with food and nutrition activities at:

- 3.1 Nation-wide level.
- 3.2 Local level, pilot project area (Kalakla).

3.1 At nation-wide level, the following nutrition problems are under study:

- 3.1.1 Protein-calorie malnutrition in early childhood (PCM)\*.
- 3.1.2 Breast feeding, supplementary feeding and weaning practices (BSW).

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\* In this report PCM means: "an uninterrupted downwards gradient running from normal, through mild and moderate degrees of malnutrition, to severe syndromes, including kwashiorkor and nutritional marasmus." "It is a generic term to cover the whole range of mild to severe, classifiable and unclassifiable manifestations, including the two main severe clinical syndromes of kwashiorkor and nutritional marasmus. (Jelliffe WHO Monograph Series No. 53 page 179), and by malnutrition in this report it is meant: "Any disorder of nutrition" (Dorland's Illustrated Medical Dictionary, 24th edition) and more specifically related to PCM.

- 3.1.3 Anaemias as a public health problem.
- 3.1.4 Endemic goitre (EG).
- 3.1.5 Vitamin A deficiency.
- 3.1.6 Adequacy of diets.
- 3.1.7 Nutritional status of the population (including growth and development studies).
- 3.1.8 Nutrition education and training of personnel.

Action programmes to deal with these problems will be implemented as soon as findings from one area (small or big) are known. For the implementation of action programmes there is no need to wait until the studies have covered the whole country.

We believe that the eight nutrition problems mentioned above are the main public health nutrition problems present in every developing country and Governments should make every possible effort to study and solve these problems on nation-wide basis. Of course in some countries there may be other public health nutrition problems that affect a great percentage of the population big enough to be considered as a public health nutrition problem. In this case these problems should also be studied on nation-wide basis, by the countries concerned.

For each one of these studies specific techniques should be used. The size of the sample to be studied, the material and methods to be used, etc. are different for each one of them.

A Achievements of the ANP at nation-wide level projects

- 1. Protein-calorie-malnutrition (PCM).

The main findings of the specific PCM prevalence survey carried out in some places of Khartoum, Northern and Blue Nile Provinces in brief showed:

- 1.1 The overall incidence of PCM found was 55.9% regardless of places, sex and ages.
- 1.2 In males the incidence was 54.2% and in females it was 57.6% regardless of places and ages.
- 1.3 In MCH centres it was 54.0% and in OPD it was 57.2% regardless of sex and ages.
- 1.4 The highest incidence of 85.2% was found in Port Sudan and the lowest of 20.0% in Wad Medani regardless of sex and ages.
- 1.5 The incidence of PCM in:
  - a) Babies six months old was 39.6% regardless of places and sex.
  - b) Children one year old was 64.7% regardless of places and sex.
  - c) Children two years old was 58.2% regardless of places and sex.
  - d) Children two and a half years old was 53.7% regardless of places and sex.
  - e) Children three years old was 52.5% regardless of places and sex.
- 1.6 The total sample consisted of 9,476 children of both sexes from one month to five years of age, examined at MCH centres and out-patient department (OPD) of hospitals. MCH centres and OPD were selected for this PCM prevalence survey because it is easy to examine many children daily as mothers bring their children to these centres seeking medical treatment for different diseases conditions (gastro intestinal, respiratory, etc.). Comprehensive PCM surveys should be conducted at community level in places where prevalence PCM surveys in MCH centres and OPD show that the incidence of PCM is 10.0% or higher.
- 1.7 The criteria used in these PCM prevalence surveys was presence of:
  - a) Poor muscle development.
  - b) Poor cellular subcutaneous tissue development.

- c) Mental disorders e.g. irritability, apathy, unfriendliness, etc.
  - d) Signs of pre or full developed kwashiorkor and/or marasmus
- 1.8 Other signs of PCM such as retardation or arrest of growth and development (height and weight below expected standard) or biochemical studies, etc. were not done for the following reasons:
- a) Shortage of well trained personnel and facilities.
  - b) Lack of local standards to compare findings (heights and weights, biochemical, etc.).
  - c) Inaccuracy of ages in many cases.

Grading of PCM in three degrees (Gomez classification) was not done.

- 1.9 These findings indicate clearly that PCM is a major public health problem in the samples surveyed; and comprehensive PCM surveys at community level should be carried out to complete the study. Nonetheless these findings provide a very valuable information from the public health point of view and point out that basic action projects should be implemented in the places surveyed.

## 2. Breast feeding, supplementary feeding and weaning practice (BSW) studies

The sample for this survey consisted of 1,146 lactating mothers attending MCH centres and OPD in Khartoum and Northern Provinces. A special questionnaire was used. The mothers were interviewed along in a room and questions were asked in an easy, clear, simple form, answers were not suggested.

We would like to present to you in brief the main findings of this study; they were as follows:

2.1 General findings:

48.7% of the mothers were in the 20 - 29 year age group.

74.1% were illiterate.

97.3% reported their occupation as house wives.

95.5% were multiparas.

83.1% had from one to five children alive.

97.7% stated that it is important to look properly after their children.

70.8% of their children were from six to eighteen months old, ranging from one to sixty months.

Most of the mothers stated that they were looking after their children.

2.2 Breast feeding findings (BF)

BF alone (no supplementary feeding) was reported by 13.3% of mothers.

94% of mothers started BF during the first three days of babies' life.

70.1% reported BF on demand.

84.3% reported BF at night.

58.2% reported eating or drinking special foods during the BF period and twenty foods or drinks were recorded as special ones.

85.7% reported not to avoid special foods or drinks during the BF period and fourteen foods or drinks were mentioned to be avoided. Milk, eggs, meat, fish, beans and green vegetables were avoided by a small percentage of mothers.

2.3 Age of weaning\* (stopping breast feeding)

5.1% of mothers stopped BF when their babies were 6 months old or less.  
11.9% " " " " " " " " 7 to 9 months old.  
14.4% " " " " " " " " 10 to 12 months old.  
45.9% " " " " " " children " 13 to 18 months old.  
18.9% " " " " " " " " 19 to 24 months old.  
3.8% " " " " " " " " 25 months old and more.

2.4 Method of weaning

82.3% of mothers reported stopping BF abruptly, suddenly.  
17.2% of mothers reported stopping BF by applying substances to their breast.  
31.2% of mothers reported stopping BF by sending the child away.  
40.2% of mothers reported stopping BF by denying the breast to the child.  
6.9% of mothers reported stopping BF by other methods.  
80.4% of multiparas reported not changing methods of stopping BF (weaning).

2.4.1 Reasons reported for weaning were:

Sick child was reported by 6.2%  
Sick mother was reported by 8.3%  
Old child was reported by 29.5%  
Pregnancy was reported by 51.2%  
Advice (relatives, others) 4.8%

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\* Weaning in this report means: To discontinue the breast feeding of an infant, with substitution of other feeding habits (Dorland's Illustrated Medical Dictionary, 24th Edition).

2.5 Supplementary feeding findings (SF)

2.5.1 Age of beginning

18.1% of mothers started SF when their babies were from one to three months old.

46.5% of mothers started SF when their babies were from four to six months old.

27.6% of mothers started SF when their babies were from seven to nine months old.

7.8% of mothers started SF when their babies were from ten to twelve months old.

2.5.2 Methods of SF

The use of bottle, cup or spoon alone was not reported.

Breast and bottle was reported by 42.9% of mothers.

Breast and cup was reported by 30.4% of mothers.

Breast, bottle and cup was reported by 9.1% of mothers.

Breast, cup and spoon was reported by 4.3% of mothers.

2.5.3 Foods and drinks reported to be used in SF

There were twenty-five foods and drinks reported as used in SF.

93.2% of mothers reported to use them: of these

milk was reported by 52.3% of mothers.

lemon juice " " 41.5% " "

custard " " 31.2% " "

biscuits " " 26.3% " "

rice with milk" " 15.9% " "

Eggs appear in the tenth place of the list (frequency from highest to lowest) meat in the seventeenth place, beans in the nineteenth, fish in the twentieth and vegetables as No. 24.

The five foods and drinks used with highest frequency mentioned above, were the same mentioned as used to begin SF and 53.1% of mothers reported to prepare these foods in a special way.

2.6 Children's ages when usual family diet was consumed

16.3%	of children	consumed	usual	family	diet	when	they	were	9	months	old.
23.4%	"	"	"	"	"	"	"	"	"	"10-12	"
8.5%	"	"	"	"	"	"	"	"	"	"13-15	"
17.2%	"	"	"	"	"	"	"	"	"	"16-18	"
7.3%	"	"	"	"	"	"	"	"	"	"19-21	"
28.3%	"	"	"	"	"	"	"	"	"	"22-24	"

There were twenty-two foods and drinks mentioned as special for children in addition to the usual family diet. Eggs appear as No. 7, vegetables as No. 9, beans as No. 14, fish as No. 19, and meat as No. 22 in the list of special foods. The same five foods and drinks e.g. milk, lemon juice, custard, biscuits and rice with milk were considered by 60.3% of mothers to be special foods or drinks in SF. The reasons given were, these foods are nutritious, make babies grow well, healthy, are easy to digest, avoid diseases, etc.

There were fourteen foods and drinks reported as to be avoided in SF, mentioned by 64.6% of mothers, of these foods, meat appears in place No. 3, milk as No. 5, vegetables as No. 7, fish as No. 8, eggs as No. 10, fruits as No. 12 in the list of frequency from highest to lowest and 47.8% of mothers, gave reasons such as: these foods produce diarrhoea, not suitable for children, produce vomiting, discomfort, are not digestible, produce abdominal pain, are not nutritious, produce fever, etc.

2.7 Advice in BF, CF and weaning:

1. 36.9% of mothers reported they have had no advice.
2. 27.2% " " " being advised by health visitors.
3. 5.5% " " " " " " midwives.
4. 1.0% " " " " " " doctors.
5. 0.3% " " " " " " medical assistants.
6. 18.4% " " " " " " nurses.
7. 2.9% " " " " " " other persons.
8. 3.8% " " " " " " No. 2 and 3.
9. 0.4% " " " " " " No. 2 and 6.
10. 3.5% " " " " " " No. 4 and 6.

2.8 Questions regarding diets, taboos, etc. during pregnancy and lactation were also recorded and analysed.

2.9 From the findings it is clear that two projects need to be implemented namely:

2.9.1 In-service training courses for health personnel, especially for health visitors, nurses and midwives.

2.9.2 Nutrition education for mothers (expectant and lactating).

In both projects stress should be given to the encouragement to continue the good practices found, and to discourage and give the right advice in those practices that were found to be wrong and see that this advice is practiced. These two projects are now under preparation based on the findings of the survey. The production of a film is under study. We strongly believe that nutrition education to the public should be based on findings of surveys and not on "text-book knowledge", as it is usually done.

2.10 The findings of this BS' survey will be checked, in family dietary and individual dietary surveys that will be conducted in the same areas.

### 3. Iodine deficiency study

A sample of 8,274 school children of both sexes and from four to eighteen years of age from thirty-five schools in the Khartoum, Northern and Blue Nile Provinces have been studied to find the incidence of Endemic Goitre (EG). In brief the findings are:

3.1 The overall incidence of EG was 26.4%. For Khartoum Province it was 25.2%, for Northern Province (Atbara) it was 29.8% and for Blue Nile Province (Mad Medani and Sennar) it was 32.1%.

3.2 In boys the overall incidence was 24.6% and in girls it was 29.4% regardless of places and ages.

3.3 12.1% incidence was found in children four years old, and 40.1% in children thirteen to fourteen years old.

The technique used in this survey was the one recommended by WHO. Most of EG found was Diffuse Grade I.

These findings show that EG is a public health problem in the areas surveyed. The survey will continue to cover the whole country.

### 4. Nutritional status of school children

The nutritional status of 5,356 school children of both sexes and from three to eighteen years old from twenty-three schools of the same three Provinces were studied and in brief the findings were:

Of the total sample there were 53.3% of children classified as malnourished, amongst boys 59.0% and amongst girls 47.6% were classified as malnourished. In four year old children (both sexes) it was found that 54.3% were suffering from malnutrition and at the age of seven it was 64.2% and at the ages of nine to ten it was 69.9%.

5. Nutrition education and training

The syllabi of the nutrition courses given to students of the Nursing College, and midwives have been revised. Lectures in nutrition are given to medical students, nurses, midwives and health inspectors.

Nutrition education to the public is given at all levels of the health services.

B. Food and nutrition activities at local level

(Kalakla Pilot Project Area)

In the Kalakla pilot project area the activities are as follows:

- a) Assessment of the aetiology, epidemiology and other characteristics of the nutrition problems, mentioned in paragraph 3.1 (nation-wide level). Some of these problems have already been assessed (endemic goitre, nutritional status of school children, environmental health, census, etc.) Some are under study (adequacy of diets, growth and development, levels of nutrients in body fluids, protein calorie malnutrition in early childhood, breast feeding, supplementary feeding and weaning practice).
- b) To study agricultural problems of farmers in the community and to implement projects to improve and increase food production (mainly vegetables).
- c) To assist goat owners of the area to increase goat's milk production by improving animal husbandry.
- d) To assist fishermen of the area to increase the catching of fish and to improve storing and marketing facilities.
- e) To assist poultry owners of the area to increase eggs and poultry (meat) production.
- f) To train personnel on applied nutrition activities (a training centre will be established; plans are under study).

- g) To implement projects to deal with problems found such as PCM (nutrition rehabilitation centre, etc.). Breast feeding, supplementary feeding and weaning practices (special nutrition education project). Nutritional status of school children (feeding schemes), anaemias, etc.

A house to house census and environmental health survey (including biochemical and bacteriological examination of water from wells) have been conducted. The activities of the pilot project area will be extended to other areas of Sudan.

### C. Weaning nutrition activities

1. The weaning nutrition activities in developing countries could be considered under two broad headings, namely:
  - 1.1 To study the food and nutrition problems that affect pregnant women, lactating mothers, infants and children from one to five years of age.
  - 1.2 To implement specific action projects to deal with these problems.
    - 1.1. Regarding the study of the food and nutrition problems that affect the nutritionally vulnerable groups mentioned above, we have presented you some of the preliminary findings of our studies.
    - 1.2. In connection with the implementation of action projects to deal with these problems, we would like to summarize for you the activities carried out in Sudan as follows:
      - 1.2.1 Distribution in MCH centres of dry skimmed milk powder (UNICEF).
      - 1.2.2 Cooking demonstrations in MCH centres.
      - 1.2.3 Nutrition education to mothers by different means.
2. Apart from this the Government has already made plans for:

- 2.1 The establishment (in the very near future) of the first Nutrition Rehabilitation Centre and spread these centres to other areas.
- 2.2 The development of a protein-rich food mixture, to be used in supplementary feeding, (weaning food). In the meantime as the development of these processed protein-rich mixtures takes a long time, the problem of improving the supplementary feeding during the weaning period will be approached as follows:
  - 2.2.1 Implementing a special nutrition education project to mothers (based on the findings of the BSW survey) and giving in-service training to health workers. The production of a film based on the findings of the BSW survey is at present under study.
  - 2.2.2 Developing food mixtures (recipes) based on local foods available in each area . These recipes will be developed in the experimental kitchen of the ANP, aiming at the production of recipes which amino-acid pattern will be as close as possible to that of the reference protein. Once a recipe is developed for an area, mothers will be taught to prepare the recipe using the right amount of the different ingredients, cook them in the proper way and, if possible, to prepare them altogether in the same pot. Dietary surveys will give information on foods that could be used in supplementary feeding, its availability, ways of preparation, etc., for each area and based on this data recipes will be developed for the area.

It is realized that the development of processed protein-rich mixtures as weaning foods are an essential step in combating PCM in developing countries, and every effort should be made in this direction. Unfortunately the developing of these processed food mixtures, call for special knowledge,

equipment, funds, etc., that are many times far beyond the resources of some developing countries. It seems, therefore, that in the interim the approach of "home made recipes" as briefly mentioned above could assist in the solution of the food and nutrition problems of the weaning period, mainly in combating PCM.