DEVELOPMENT OF A NUTRITION EDUCATIONAL PROGRAMME FOR MOTHERS ATTENDING MATERNAL AND CHILD HEALTH CENTRES – IN KHARTOUM PROVINCE

BY

MARIAM MOHAMED KHALIDAI

A thesis submitted to the University of Khartoum for the requirement for the degree of Doctor of Philosophy

1989
DEDICATION

TO MY FAMILY WITH LOVE

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ABSTRACT

This study was an attempt to develop a nutrition educational programme for mothers attending maternal/child health centres in Khartoum Province.

The main objective of the study was to create a state of awareness among mothers about the importance of nutrition during pregnancy and lactation; its effect on their nutritional status and on the outcome of pregnancy. Also, attempted to provide variety of learning experiences as well as to develop pre and post-tests evaluation instruments.

The study was divided into five chapters. The introductory chapter covered areas that included the conceptual framework, statement of the problem, the significance, limitations and assumptions of the study. Questions posed by the study covered areas of inquiry that needed investigation, such as objectives, learning experiences and evaluation procedures for the intended programme.

Chapter II traced the educational development of nutrition in some of the developed and developing countries. This was intended to reflect the general concepts of nutrition education worldwide. A detailed historical background to the development of nutrition education in the Sudan was also included.
educational objectives are identified and clarified and efficient communicative methods such as individualised nutritional counseling coupled with follow-up home visits are performed.

Part III of this chapter gave a full account for a theoretical process of programme development as well as description of the actual learning experiences that had been done in Khartoum Model Clinic. It included the four major tasks and nutrition counseling lesson-plans.

Chapter V made up the summary of the study, conclusions and recommendations. It also included suggestions for further research studies.
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CHAPTER 1

INTRODUCTION
INTRODUCTION

CONCEPTUAL FRAMEWORK OF THE STUDY

Although it is possible to discuss formal, nonformal and informal education in general and theoretical terms, for nutrition education to have any particular meaning, it must be placed in a particular context. The subject of nutrition and nutritional problems in the Sudan has been taken up in an intensive manner through at least two ministries - the Ministry of Health and the Ministry of Education. Applied nutrition programmes are currently being implemented in these two bodies with the assistance of the Food and Agriculture Organization (FAO), World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF).

These programmes have two components: education of the masses and increasing food production in the form of home and school gardens, poultry-keeping and supplementary feeding programmes. The philosophy of these efforts recognizes that informed opinion and co-operation on the part of the public are of utmost importance in the improvement of nutritional and health status.
But in the Sudan as in other developing countries such programmes are faced by many difficulties such as the high illiteracy rate and deeply rooted cultural beliefs and superstitions, as well as social and economic poverty. It has now been recognised that poverty and scarcity of food are not the only causative elements of malnutrition. Lack of nutrition knowledge and sticking to a traditional mode of production and style of living are also important causative factors. Thus it appears that there are several areas which are directly related to nutritional problems: notably, nutrition education, economic development, antipoverty measures, environmental health, provision of clean water as well as the use of technological facilities that are inexpensive, available and appropriate to local conditions.

This study aims to formulate measures to overcome nutritional problems during pregnancy through the development of a nutrition educational programme based on descriptive analysis of socioeconomic factors as well as nutritional and health status. Obviously it is very difficult to designate the exact role played by nutrition education in improving the nutritional status of the respondents. Nevertheless, education in general and nutrition education in particular is known to create a change in the behaviour of the respondent.
Therefore, the main goal in formulating this educational programme is to create learning opportunities that enable pregnant women and lactating mothers to gain some basic nutrition knowledge. Knowledge of nutrition is no guarantee of application, but Schwartz (1975) and Duffy, et al. (1975) reported that:

"more knowledge may be helpful in eventually selecting better diets".

Den Hartog (1946) stated that:

"Popular education in nutrition should have its aims to give so much information that the consumer knows what he eats and why, then he can choose his food and his meals to provide and optimum mixture".

Some nutrition educators see nutrition education as a global effort for liberation from hunger, disease and inhuman conditions. This view of nutrition education implies the presence of a situation in which respondents are acting as subjects and not passively receiving information or being acted upon as objects. According to this philosophy, Drummond (1973) described nutrition education as "Conscientization" and the awakening of critical awareness among people who suffer from many deprivations, including food and nutrients. This idea of incorporating nutrition education as part of a global effort is not new. It was suggested by Bower, (1966) who said:

"I doubt if nutrition education can do it alone, rather, I see the nutrition message as an essential element"
in a more comprehensive adult education programme, using every appropriate channel of communication to reach its target. I see it especially taking an important place in the new world literacy programme which is gaining momentum under the United Nations General Assembly and UNESCO.

Following this discussion of the framework of nutrition education, it can be seen that nutrition messages do not consist merely of imparting facts in an adult primer. The general problem is the creation of a humanizing set of conditions.

Therefore the basic concept of developing this nutritional educational programme is based on a number of simple principles, beginning with learning first from where the respondents were. In other words, the intention was to find out what respondents knew, thought, believed and did in the area of food and nutrition.

The next principle was to use all suitable available health services and facilities.

The application of the first principle required close examination of the different variables that might affect the food intake, food habits and nutritional status of the respondents. Evidence from local literature revealed that nutrition is publicly perceived as the preparation of food and is largely introduced under the system of apprenticeship where a girl learns from her mother or elder sister. The
broad-based characteristic of nutrition education is that practice precedes theory, and thus perception of nutrition as a science is lacking.

One of the field studies which illustrates the need for nutrition education was carried out in the Nutrition Division, Ministry of Health. Younis (1972) reported that home visits coupled with nutrition education conducted by nutritionists, revealed a significant change in weaning practices and food habits of young children. Another study in Khartoum Province carried out by Shazali (1987) stated that nutritional status of children depends on how food is distributed among the family members. This author discovered the existence of traditional practices from birth such as not giving breast milk (colostrum); that supplementary food often consists of sugared water given in poorly cleaned bottles, and that weaning was frequently sudden followed by many complications affecting the infant’s health. Shazali blamed Sudanese society for being sole dominated. Since men control the household budget, their own spending on drink, tobacco and recreation can leave an insufficient amount for plentiful, nutritious food. Women are also blamed for saving money on food in order to buy jewellery and clothes. Literacy and early marriage contribute to the improper handling of children’s food, as do wrong beliefs about vaccines. Shazali (1987) also
stated that most mothers—regardless of their class position—did not know the best way to breastfeed. They were also unaware of what kind of supplements to give to their children and when they were appropriate. The author found that there was a significant difference between mothers of normal healthy children and mothers of those suffering from Kendelker and marnamas. Mothers of the normal children took more and better food during pregnancy. Shazali (1987) indicated that malnutrition is not just due to lack of food but also due to the sociocultural and economic characteristics of families, income level, food expenditure, manner and size of the family, and also play a crucial role in determining nutritional status in Sudanese society which is male dominated and adult oriented. Finally, Shazali (1987) reported that direct contact with mothers through trained midwives, health visitors, social workers, and doctors was essential in improving food habits and children’s diets at home.

However, the idea behind educating women in the area of nutrition and food and its relation to health is not new in the Sudan. Bayoudi, (1977) said that:

"Women's education in domiciliary midwifery started in 1921 and the course was promoted in 1930 to include infant welfare, hygiene, antenatal care, and home visiting."
Actually there is no definite place for nutrition as a separate subject in the midwifery or school curriculum, despite the fact that the need for nutrition education was mentioned by Zahawi & Samse (1972) in the First National Seminar on Food & Nutrition in the Sudan. They considered that emphasis should be placed on the following aims:

1. Creation of nutrition awareness among women through the use of data gathered.
2. Adequate training programmes should be incorporated in the professional courses of all levels of health personnel including doctors.

As a consequence of that seminar and the establishment of the two divisions for nutrition activities in the Ministry of Health and Ministry of Education, nutrition educational activities became an area of increasing interests particularly with regard to its relation to the national goal: "Health for all by the year 2000". Yousif (1972) pointed out that nutrition education in health agencies—including the nutrition division—was very specific in its objectives and was directed toward prevention of malnutrition in the clinical stages and its treatment through diets and rehabilitation.

The term 'clinical malnutrition' implies that the nutritional problem is viewed as a medical problem. This
view reveals part of the true picture, as many investigators like Zumrawi et al. (1984), Mossefa (1963) had pointed out that the nutritional problem in the Sudan is "a social problem rather than a medical one". It is related to problems of poverty, ignorance, exploitation and lack of production.

It is apparent from the previous account that there are many factors responsible for malnutrition and lack of knowledge was a common factor. Education can be a major means for:

1. Elimination of Cultural factors that adversely affect food consumption.
2. Elimination of ignorance about nutritional requirements and the nutritional values of food.
3. Encouraging an agriculture system that will ensure food availability all the year.

It can be seen that nutrition may be applied and integrated with other educational activities notably, health, agriculture, and economic planning. It can also be directed toward all educational and economic levels of the population with a great emphasis on vulnerable groups after studying their conditions and identifying their problems and needs.
Moreover it had been observed that malnutrition in most cases has a sociocultural and economic dimension. The previous account has drawn attention to the gradual development of the nutrition education concept and the significant role it may play in improving the nutritional status of mothers and their children.

Statement of the Problem

The problem of lack of nutrition knowledge among women was observed in the rehabilitation centres and during the small nutrition surveys undertaken by teams of nutrition officers during the years 1969 - 1979, when the researcher was one of the nutrition guides.

Actually, there is strong evidence to demonstrate the need for nutrition education, particularly in the Sudan where there is a lack of nutrition data, high illiteracy rate and high incidence of malnutrition. UNICEF/WHO (1969) reported that:

"There was a severe nutrition problem in the low income families in many parts of the Sudan. This was reflected in high prevalence of diarrhoeal diseases, poor maternal nutrition during pregnancy, low birth weight due to inadequate food intake by pregnant women because of food habits as well as food shortage."
A study reported by UNICEF/WHO (1982) indicated that 25% of newborns in hospitals in Khartoum and Gatra area, weighed less than 2,200 gms.

The problems of malnutrition are aggravated by the low coverage of immunization measures and the presence of infectious diseases such as malaria. Obviously the presence of any nutritional problem is due to many factors which can not be solved by education alone. This fact presents a singular challenge to nutrition educators. For example, food technologists can develop new low cost nutritious food, agriculturists can improve methods of food production and more food can be available. But unless a fundamental change can be affected in dietary habits, new food or improved available food can not be of any value. Moreover, because dietary surveys which measure food consumption are costly and require a national plan which is beyond the capabilities of this study, the problem of malnutrition during pregnancy will be dealt with from the educational point of view alone.

Moreover no formal attempt or study has been made to find out whether the nutrition activities offered in health centres are performing their functions in order to achieve their ultimate objective and goal, i.e. the provision of optimum nutrition and promoting the well-being of attendees.
On the other hand, evidence from much local literature has illustrated that nutrition illiteracy is widespread; there are common misconceptions concerning beliefs about nutritious foods. These include the strong belief that lemon juice is very nutritious; that synthetic vitamins, fattening foods are beneficial and incurative medicine measures. It is also believed that malnutrition is a normal stage of development that every child has to pass through.

Moreover, during the past three decades a large number of rural women have migrated to Khartoum Province, following their husbands. This movement created changes in their modes of living and the character of their home-based produced diet and their methods of feeding and weaning their children.

There is considerable clinical evidence that the current eating pattern may contribute to the incidence of protein calories malnutrition among children and nutritional anemia among pregnant women.

This evidence, together with other factors, has indicated the need for nutrition education which provides women with an understanding of nutrition concepts that will enable them to make informed decisions about food choice for themselves and their families.
Significance of the Study

This study has not been preceded by any attempt to develop a nutrition educational programme in Maternal Child Health (M.C.H.) centres. It is thus the first of its kind to be attempted in order to make an assessment of pregnant women's health, and nutritional status as well as nutrition knowledge.

In the last decade efforts to disseminate nutrition information have been directed towards the female population through Ministry of Health and Ministry of Education. But the information on health education concentrates only on medical advice directed mainly to child care. From time to time, midwives have introduced nutritional advice to pregnant women. This advice is built on a process trial and error and personal experience rather than on an organized curriculum. Such advice, referred to by some authors as "massages", may cause respondents to be confused and lose faith in the educators.

So this study will be a contribution to the development of a nutrition educational programme with specific objectives, contents, methods of instruction and evaluation. Such objectives will be suitable for the maternal health centres and in any gathering of women in order that a large
portion of women will be wisely advised and directed towards achieving an optimal nutritional status for themselves and for their families.

This study could form the basis for future research on nutrition education activities. Moreover, future researcher may conduct similar studies in different regions in the Sudan.

Nutrition educators who are mainly concerned with programme planning in M.O.H. centres and nutritional provincial centres may derive information from this study.

The results obtained from this study will contribute to the development of the traditional birth attendant curriculum by rectifying imbalance between clinical instruction and nutritional activities.

Fortunately several nutritional surveys carried out as a follow-up in the Nutrition Division of the Ministry of Health revealed that the information given to mothers in the rehabilitation centres was fairly well adopted. This could be attributed to the fact that the health personnel have an acceptable status in the community.
So this study takes this advantage as a state of motivation in which pregnant women come for medical advice and nutrition education to M.C.H. centres. Moreover, this philosophy of educating mothers in clinics has the advantage of changing the relationship between health providers and the "client" i.e. the respondent pregnant women, so that they will become responsible and less dependent upon experts. UNICEF in 1987 advocated that mothers should be actively involved in weighing their children and charting their growth. So the involvement of parents in monitoring growth, in developmental education, in formulating new weaning foods, in being central figures in primary health care of their children gives them the knowledge and skills to act on their own behalf. It is also an innovation in the health delivery system. So the researcher, being a home economist with a background in food, nutrition and family planning counselling and teaching experience would like to make a major contribution to the process of educating families in the area of nutrition education with emphasis on modification of food habits when required in order to restore the full benefit of available available food resources.
Objectives of the Study

The primary aim of this study is to formulate and develop a nutrition educational programme for pregnant women attending maternal and child health centres.

Specifically, this study attempts to achieve the following objectives that have implications for developing needs, assessments instructor instruments, curriculum foci and base line data for evaluation of the proposed programme.

1. To develop an awareness among pregnant women and lactating mothers that proper nutrition is necessary throughout life and particularly during pregnancy in order to have babies with a desirable birth weight.

2. To provide sound basic nutrition information for pregnant women so that they may effectively combat lack of nutritional knowledge concerning nutrient deficiency problems e.g. anaemia.

3. Provide a variety of learning activities such as individual counselling, discussion, question and answer sessions, case studies, problem solving and audiovisual aids.
4. To provide test instruments to evaluate respondents' knowledge gains in basic theoretical principles of nutrition.

5. To provide an opportunity for incorporating nutrition educational in the programmes of M.C.H. centres.

6. To make recommendations for an integrating health and nutrition educational programmes for pregnant women and lactating mothers at a national level.

QUESTIONS TO BE ANSWERED BY THE STUDY

This study attempts to answer the following questions:

1. Are there specified objectives for the nutrition educational activities performed in M.C.H. centres?

2. Are these objectives relevant to prevalent nutritional problems facing pregnant women attending M.C.H. centres?

3. What type of nutrition educational activities are performed in M.C.H. centres?

4. Are the facilities needed for carrying out the learning experience available and adequate in each M.C.H. centre?

5. What type of information needs to be given to mothers attending M.C.H. centres?

6. What do mothers attending M.C.H. centres know and perceive about foods and nutrition?
7. Is there a nutrition education system responsible for planning, organizing and implementing nutrition educational programmes in M.C.H. centres and the country?

8. How can nutritional programmes be organized and introduced in M.C.H. centres?

9. Who should organize and teach nutrition in M.C.H. centres and the country as a whole?

10. Does the teaching methodology in M.C.H. centres lead to the organization of learning experiences?

11. Have the nutrition officers a leading role in the organization of the learning experience in M.C.H. centres and the country?

12. Do nutrition officers have instruments to evaluate the impact of nutrition educational activities on the nutritional and health status of pregnant women attending M.C.H. centres?

13. Are there future plans for improvement of nutritional educational activities performed in M.C.H. centres?

14. Do nutrition education experts participate in the evaluation procedures of nutrition educational activities in M.C.H. centres?

15. Is there an educational system responsible for evaluation of the nutrition educational activities performed in M.C.H. centres?
PROCEDURE OF THE STUDY

This study attempted to collect data from four types of populations:

Population I consisted of pregnant women attending Omdurman comprehensive child health centres.

Population II consisted of pregnant women attending Khartoum Model Clinic for Mother and Child Care.

Population III consisted of nutrition officers who conduct nutrition educational activities and at the same time train nutrition educators, working in Maternal Child/Health Centres.

Population IV consisted of nutrition education experts who are the directors and planners of nutrition educational activities.

Samples were taken from the four populations, as follows:

Sample I, II, III and IV were selected randomly from population I & II, sample I was selected from pregnant women attending Omdurman comprehensive child health centre. Sample II was taken from pregnant women attending Khartoum Model Clinic. Sample III consisted of 10 pregnant women attending Khartoum Model Clinic. Sample IV consisted of all nutrition officers who were working in maternal/child
health centres. Population IV consisted of nutrition education experts in Khartoum Province.

Three written questionnaires were designed and used through interview to collect data from the above mentioned samples. An un instructed interview was held with population IV.

The data collected were analysed by presenting questionnaire items in the form of tabulation responses and obtaining results in numbers and percentages so that responses over 50% will be considered significant. Other methods of analysis such as the T-test and regressions were applied to measure changes in knowledge scores between the pre- and post-nutrition tests. Details of the study procedure are given in chapter III.

ASSUMPTIONS OF THE STUDY

This study is based on the following assumptions:

1. Khartoum Model Clinic, with its central geographical position in the capital Khartoum which is accessible by all means of public transportation attracts a large number of women and children. Moreover the clinic which was established by the Sudan Fertility Control Association, is well equipped with facilities and
well-trained health personnel. Work and activities such as antenatal care, medical care, children's check-ups, immunization and family planning techniques are well organized.

2. The contribution fees paid are very low compared with other private clinics.

3. The clinic provides the needed medicine and synthetic nutrients such as vitamins and minerals free of charge and so it attracts women from various parts of the province. For these reasons, samples taken from this clinic could be representative of the whole province.

4. Samples selected from population if have the same characteristics because they are following the government policy of administration.

5. Sample V represents the best qualified personnel in the country who have had long years of experience in the field of food and nutrition and maternity health services.

6. Questionnaires with pre- and post - tests instruments, interviews and home visits accompanied by observation of the participants were assumed to be reliable tools for data collection.

LIMITATIONS OF THE STUDY

In this study the following limitations were considered:

1. It is limited to developing a nutrition educational programme for pregnant women attending Khartoum
maternal health centres and especially Khartoum Model Clinic where the fieldwork was done.

2. The study is limited to pregnant Sudanese women at four months of pregnancy, attending N.C.H. centres, who had no health problem such as diabetes or high blood pressure and whose ages are not less than 18 years.

3. Evaluation of the programme will be built around the results of the pre- and post-nutrition tests rather than an evaluation of nutritional and health status of pregnant women and their infants.

DEFINITIONS OF TERMS

Development:

Formulation of activities that increase levels of nutritional knowledge or raise standard of awareness in the area of nutrition and food.

Programme:

A series of learning experiences introduced to women in the form of a pamphlet, nutritional counselling lessons, discussion and home visits. Suggested topics in some nutritional areas will be described in detail coupled with some examples of lesson plans.
Nutrition:

The study of food in relation to health and the process by which living organisms use food for maintenance of life, growth, provide for normal functioning of body organs and produce the energy the body needs.

Undernutrition:

Is mainly insufficient per capita calorie intake due to inadequate quantity of food. If this condition persists for a period of time it can lead to either loss of body weight with the same physical activity or to reduced activity for the same body weight.

Malnutrition:

Refers to the quality of the diet, where quantity may be sufficient or it may be unbalanced. Malnutrition can result from either prolonged undernutrition or overnutrition or overnutrition.

Non-Formal Nutrition Education:

Is nutrition education that takes place in preschools such as nursery schools and day-care centres. It is also performed in discussion groups, clubs, adult education classes, nutrition rehabilitation centres and through agricultural extension, posters in public
transport and market places and village cultural activities.

**Informal Nutrition:**

Is defined by UNICEF (1980), as “education that takes place in everyday living, in the household for example grandmother’s advice on infant diet”.

**Nutrition Expert/Educator:**

An experienced nutritionist or non-nutritionist who is promoted to an administrative position and can be effective in planning and executing a nutrition educational programme.

**Nutrition Officers:**

Are those who have graduated from a college or institute with a bachelor’s degree in home science or science with major emphasis on nutrition and food or nutrition and education.

**Summary:**

Nutrition educational activities in maternal/child health centres represent an important effort to combat nutritional problems during pregnancy, particularly nutritional anemia and low weight gain due to inadequate food intake.
These activities are also important to investigate the cultural and socio-economic factors that affect nutritional status. The main purpose of this study is to develop a nutrition educational programme. The objectives, content, methods of instruction and evaluation procedures will be derived from a descriptive analysis of the population studied i.e. pregnant women, nutrition officers and nutrition education / experts.

Tools used for the study are questionnaires, interviews of samples I, II, III and IV as well as an unstructured interview and personal communication with sample V. Home visits and participants' observation of respondents are employed to sample II after delivery.

Data collected will be analysed and presented in the form of tables and the frequency of responses will be converted to percentages, to t-test difference and finally, most of the findings will be used in planning the educational programme.
CHAPTER II

LITERATURE REVIEW
CHAPTER II

LITERATURE REVIEW

INTRODUCTION

This chapter is devoted to a review of the literature related to the study. Few studies have been conducted in the area of curriculum development for nutrition education, so the review is confined to the following areas:

2. Historical development of nutrition concepts.
3. Nutrition education in some developed countries.
4. Nutrition education in some developing countries.
5. Historical development of nutrition education in the Sudan.
6. Review of literature related to nutrition in maternal child health (M.C.H.) centres and some relevant studies.
7. International efforts to establish nutrition education in health related fields.

CONCEPTS OF NUTRITION EDUCATION

Nutrition is a young science born in this century which has grown into a multidimensional and multidisciplinary field. According to Massie and Banthe (1985):

"In the past nutrition education has been defined as an information about nutrients in foods, how nutrients effect growth, bodily development and function, and how
diet should be composed to satisfy the best balance of nutrients intake according to recommendations”.

Peterson (1980) also said:

"Nutrition education is the sum total of the experience, knowledge and skill possessed by the individual and the family and to translate health concern into an act of buying and consuming food”.

According to this definition, it is meaningless to talk about nutrition in the abstract, there must be a consideration of the individual’s needs and state of knowledge and skill.

According to Sahn and Robert (1981) “Nutrition education projects assume many forms, from pamphlete distribution to radio broadcast; from face-to-face counselling encounters, to large impersonal classroom presentations. All are designed with a similar logic: To somehow convince the listener or a reader of the value of the message presented. Following this first step, behavioural change is expected, resulting in behaviour congruent with the media message and a lifestyle more salubrious to the listener”.

Loverton (1974) defined nutrition education as:

"A multidisciplinary process, that involves the transfer of information, the development of motivation and the modification of food habits where needed. It must form the bridge that carries appropriate information from the research and development laboratories to the public, the ultimate user".
According to Caliendo, (1979) "nutrition education is only a single aspect of a total community nutrition improvement effort. Other important components include nutritional assessment, surveillance, monitoring, overall programme planning and coordination and evaluation. The educational component is often the most visible and must be integrated into every aspect of the programme and be well coordinated with all other concerned programme components, resources and personnel. It requires different approaches and means different things to various people. For the nutrition professional, nutrition education may mean specialized, college level training to become competent in the art and science of nutrition. To the physician, nutrition education may mean that a particular patient be instructed in the techniques of modifying current food habits in response to a disease condition. To the politician, nutrition education may mean educating the public about the ways to meet nutritional requirements through consumption of an adequate diet". While Lucas and Johnsrud (1986) said:

"Nutrition education include dissemination of information, communication of carefully developed messages to persuade people that it is necessary and possible to adopt healthy eating practice".
Successfully promoting positive dietary change requires that targeted audiences receive sequential and reinforcing messages over an extended period of time, sustained education programmes based on research in the social sciences and aimed at explicit sets of behaviour changes rather than sporadic dissemination of information are needed. Greater attention needs to be given to identifying the desired culturally acceptable programme outcomes (such as knowledge of behaviour change and planning programme delivery methods that are likely to accomplish the desired outcomes). This definition represents various education strategies that involve culture and social science as well as targeting educational programmes for specific populations to adopt recommended practices by using carefully developed messages.

Jelliffe (1986) reported that "Nutrition education of the public aiming at a general improvement of the nutritional status mainly through promotion of adequate food habits, elimination of unsatisfactory dietary practices, introduction of better food hygiene and more efficient use of food resources. While nutrition training was defined as: "the academic and practical instruction in nutrition, dietetics and food science."

These definitions include most of the principles
embodied in the eight elements outlined in the Alma-Ata Declaration, where food, nutrition, nutrition education and some aspects of hygiene were considered to form part of regular services including prevention of disease and general health care. Thus nutrition education is not simply the task of designing a perfect programme, but is rather a research topic, a conceptual problem, a communication gap, a political issue, an organizational question, involving a bureaucratic contact and institutional concern. The complexity of nutrition and its role in improving public health has placed it in the first resolution and recommendation of the World Food Conference as reported by Callendo (1979):

"Governments should include nutrition in the curricula for educational programs at all levels and that all concerned in the field of agriculture, health and general education be appropriately trained to enable them, to further nutrition education within their respective domain".

So the concept of nutrition education enters all fields of education, health and agriculture.

HISTORICAL DEVELOPMENT OF NUTRITION CONCEPTS

Historically the first and oldest concept which shaped the field of nutrition and food in the past to define it as the education for women for their domestic role. It is a large and integral part of home economic subjects. According to Horn and West, (1982) "the
emergence of home economics as a science and field of critical thinking was in America. One of the noteworthy contribution of home economics to science was introduced by Ellen E. Richard by the end of the 19th century. She knew that one of the things lacking was scientific information about good nutrition and she reasoned that those who had access to such information had an obligation to share it with others. As one way to do this she established experimental kitchens that offered low-cost nutrition and sanitary meals for needy people in their homes. These meals were also served as models that enabled families to improve sanitation and nutrition. In planning her kitchen Mrs. Richard collected knowledge, synthesized it and brought it in a new setting which involved her in many thinking activities. It is thus obvious that historically nutritionists as home economists had proved abilities to synthesize scientific knowledge and information and to transfer this knowledge from one setting to another i.e., from abstract facts to learning experience applicable to daily living and contribute to health and well-being.
Abbasy (1974) said:

"The contribution of nutrition to the acquisition of health was known in Greek civilization from Hippocratic times. He stated that, "A physician must know and must be at great pains to know if he is to do his duty, what man is in relation to his eating and drinking habits generally, and what will be the effect of each on each individual".

So this philosopher advocated that for doctors to be able to treat their patients, they should know their eating habits. Moreover Passmore et al (1986) reported that "in Hippocratic times the Greek physicians advised their patients to follow the following regime:-

1. A diet of bread or other cereal, vegetables and fruit with milk, eggs, fish and a limited amount of meat should be eaten to satisfy a natural appetite.

2. Daily exercise in the open air.

3. Temperance in the use of alcohol and other drugs.

4. Daily period of rest and relaxation after meals.

5. Adequate sleep especially when young.

6. Cleanliness both personal and domestic.

In this regime the message is simple; it is originally based on observation and experience and is consistent with modern science. It also explained that nutrition is not only the provision of food but rather a lifestyle geared by healthy and beneficial habits. Thus the emergence of nutrition practices as a
behavioural science is evident. Moreover, the concept of this regime includes aspects of cleanliness and environmental sanitation. So it explained that the subject of nutrition should not stand alone, but must be integrated into related areas.

This regime also called for moderation in the use of alcohol and drugs which is part of the new concept of health education Passmore et al. (1980) said:

"In America the four major risk factors that affect public health are: diet, physical activity, the use of alcohol and tobacco".

So nutrition developed from being a home-based activity performed by women to scientific knowledge collected from daily-living experience and analysed in a laboratory and returned to the public, to modify their behaviour i.e. food habits. Such a development calls for cooperation and organization of different agencies and ministries. Passmore et al. (1986) said:

"Each of us needs nutrition education and this education is needed especially for those who are in position to influence public opinion".

This is true for prosperous urban communities as well as for poor rural agriculturists. The nature of the food produced and its processing have changed rapidly owing to the scientific revolution taking place in agriculture and technology.

Mead (1955), Fouter (1962) and Ritchi (1967)
agreed that the food habits of a society are subject to constant evolution and spontaneous change may be observed any time and anywhere. For example, potatoes of South America origin are consumed daily throughout Africa, the sudden and often nutritionally incongruous acceptance by the urban population of Coca-Cola, white bread and polished rice is frequently observed in many areas.

Many studies have demonstrated that nutrition education has a positive effect in improving nutrition as well as nutritional status. Sevenhysen (1972) reported that studies in India indicated that nutrition education had been demonstrated to improve nutritional status. Whitehead (1973) reported that nutrition education can change dietary habits with carefully defined limits. While McKenzie and Numford (1963) gave the following conclusion after reviewing twenty-six publications: "nutrition education can neither be regarded as always effective nor always ineffective, its impact depending on programme design and personnel".

Obviously sound nutrition information is essential for rational decision-making and desirable change. Yet sound nutritional knowledge does not guarantee good nutritional status. Many people in developed countries and with adequate knowledge about food and nutrition do not eat properly. Passmore et al (1986) said:
"Taboos are not confined to dark Africa and prescriptions for elixir did not end in the seventeenth century. A few doctors today put a taboo on eggs because of their cholesterol content and a few prescribe large doses of vitamins as an elixir against all manner of disorders".

At the other end of the spectrum, lack of nutrition knowledge and ignorance together with other factors such as poverty, the population explosion and poor environmental sanitation appear to cause and aggravate malnutrition. Based on a study in India, Shah (1978) concluded that: All maternal nutrition improvement programmes must include educational activities emphasizing, the need for a better use of locally available nutritious foods. Much of the malnutrition could be combated through training of elderly women and traditional birth attendants to provide nutrition information and promote beliefs favourable to pregnant women. Various methods of nutrition and health education could be utilized, however importance should be given to person to person education".

According to Sim and Wright (1978) "types of nutrition programmes which currently exist may be coterminized into two major approaches: Environmental and personal focus approaches which is termed as nutrition education, because in this strategy the individual is taught how to choose from available foods those which
are "more nutritious". From these approaches two main schools of thought were developed.

The first one is known as the educational school and described by Ritchie (1967) as: "using teaching techniques extrapolated from education or community development. Its aim is to inform about awareness, to train and to stimulate change towards nutrition improvement. These principles are applied in programmes of hygiene, nutrition education, home economics and are meant to introduce the principles of a balanced diet". Teulon, (1966) reported that these educational programmes are either independent or integrated in a large programme such as community development. They may or may not be coupled with group leading programmes. They are developed in schools, clubs and at work. The majority use direct teaching techniques and are often applied to small groups. The programme may be of a long term duration to obtain lasting results which in the end will be integrated in the culture and transmitted from generation to generation. De Garine (1972) reported that these educational programmes aim to be scientific and free from all political and financial content. They concentrate on localized pilot programmes for which they are expected to expand.

The second school of thought, called the
promotional school, was described by Yudkin and McKenzie, (1965) as strictly limited to making available to organizations who wish to promote nutrition well-being, techniques that have proved successful businesses in industrial society. The promotional school aims at processing, selling and seeking the acceptance of products by as many consumers as possible and for as long as possible. It draws heavily on the technical means of publicity and mass communications. In contrast with the educational school, the promotional school is not concerned with bringing about permanent change in nutritional concepts.

Actually the two schools have distinct and separate objectives. Some recent attempts have been made to combine their positive features. Fewster (1970) said:

"In consumer education today, a lecturer may use techniques of mass communication worked out by publishers".

De Garine (1972) reported that unfortunately, the development of these approaches and techniques is derived from trial and error as much as from the systematic cumulation of past experiences. While Yudkin and McKenzie (1965) said:

"Success and failure have one point in common, namely it is almost impossible to determine their exact cause".

But this limitation of methodology was attributed
by De Darine (1972) to: "cultural diversity that leads to the acceptance or refusal of a change in diet behaviour". Consequently any nutrition programme should include a refined analysis of the sociocultural aspects of nutritional behaviour.

CONCEPTS AND TRENDS OF NUTRITION EDUCATION
IN SOME DEVELOPED COUNTRIES

UNITED STATES OF AMERICA (U.S.A.):

As stated in the Encyclopaedia Britannica (1972) formal studies of house hold subjects both in U.S.A. and Europe began with cooking and sewing schools sponsored by private individuals or groups.

East and Harjori (1980) reported that in (1974) Cooking Schools were organized by the Women's Association of Boston and the Kitchen Gardens Movements of New York organized by the Kitchen Garden Association in (1880). It was a programme designed to teach children nutrition and household tasks through play activities.

As recorded in the Encyclopaedia (1972), the first formal instruction in home economics and nutrition at college level was at Iowa and Kansas State Universities of Science and Technology in (1883). By (1900) over 90% of high Secondary schools and thirty colleges were offering programmes of home economics with nutrition as an integrated part of the curriculum of institutions.
granting degrees in home economics and nutrition.

Todhunter (1975) reported that, "courses of dietetics and science of cooking were established in Philadelphia, Women's Medical College and Nurse Women's Hospital in (1875). A department of nutrition was established at Columbia University as a centre for teaching and research in (1909). The efforts of many nutritionists such as Mrs Richard, Mary Swartz Rose, Katherine Blunt and others led to publications the most important of which were the Recommended Dietary Allowances and various text books.

According to Kirk and Hamrick (1975), the findings of health education surveys carried out in U.S.A. indicated that nutrition was the topic most frequently addressed in the health educational programmes of the schools surveyed and yet it was the area in which success was most limited.

According to Richmond (1980) the health of American people had improved over the past 10 years due to improved nutritional habits as a result of public awareness of nutrition counselling. From (1957 - 1971) the Interagency Committee on Nutrition Education sponsored several nutritional conferences where specific recommendations were addressed to nutritionists, health professionals, community leaders and legislators. The recommendations emphasized that
nutrition education needs to be introduced to the public at large as well as to specific groups such as children, pregnant and lactating women. Molitor (1980) stated that "economically disadvantaged pregnant and lactating women historically had been of concern when devising programmes to surmount potential food deficiencies. Solutions for nutritional problems in segment of our population were both economic and educational".

In spite of all the efforts mentioned above Hanoff (1972) stated that consumers all over the world including the United States are nutritionally illiterate.

According to Logas and Johnsrud (1986), the Five Year Plan for the Food and Agricultural Sciences states: "the benefits of nutrition research can be realized by the general public when the results are translated into accurate consumer information and are added to the educational programmes dealing with food and nutrition. However the national Institutes of Health-Nutrition Coordinating Committee (1984) reported that, research in nutrition education received only 2 percent of the $ 440 million for nutrition research in (1983). Lack of significant funding for nutrition education research impedes advances in the research field and consequently the efforts of nutrition educators".
On the same topic i.e. the need for nutrition education research, Olsen and Gillespie (1981) said:

"A series of conferences in (1980) and (1981) focused national attention on future priorities for nutrition education research".

From what has been reviewed it can be concluded that nutrition education in U.S.A. had been linked with health issue, although there were other concerned agencies. As Richmond (1980) reported "for improving the health of Americans nutrition education is one key strategy and the recommendations in the nutrition conferences are commitment of five major agencies - Department of Agriculture, The office of Science and Technology Policy in the White House, The Federal Trade Commission, The Society for Nutrition Education and Health, Education and Welfare Department".

The fruit of these efforts is that the American public is exposed to a great deal of information on nutrition and dietary practices.

Richmond (1980) reported that, "in the U.S.A. "individuals have the right to make informed food choices and the government has the responsibility to provide the best information to help people make good food choice".

TRENDS AND CONCEPTS OF NUTRITION
EDUCATION IN UNITED KINGDOM

In the United Kingdom (U.K.) and most European countries as previously reported, the earliest educational programmes in domestic economy were sponsored by private groups such as women's societies with a philanthropic interest in the welfare of man and society. As stated in the Encyclopaedia (1972) the publication of Mrs Beeton in 1961 is considered as an important contribution to the development of domestic subjects. She included all aspects of cooking made by Haward Elasse in 1947 that dealt mainly with recipes for food and medicaments. A further driving force for education in nutrition and home economies was given by the international exhibition at South Kingston - London in 1873 and when J.C. Buckmaster, whose special subjects were chemistry and physics, gave a lecture and a demonstration on the application of scientific principles to cooking. Then came the establishment of the National Training School of Cooking in London in (1874). As a result of its establishment, six similar schools were created in other cities during the period (1874 - 1877). After 1911 these colleges gave three year courses which included training in the teaching of general science subjects as well as domestic and nutrition subjects. Development of nutrition subjects at a high level took place in the middle of the
twentieth century. Results of this development appeared in (1953), when London University at Queen Elizabeth College began to award a B.Sc. degree in nutrition.

Todhunter (1975) stated that: "Lucy Wills (1868 - 1964) was an eminent nutritionist in (U.K.). Her studies on nutritional anaemia among pregnant women led to the discovery of Vitamin B - folacin". Todhunter (1975) reported that Cloely Williams 1893 was an international figure in the field of nutrition of mothers and children. She introduced the word kwashiorkor into medicine and nutritional literature.

Neuberger (1983) made the following points:
1. Nutrition education in U.K. is very important in preventive medicine.
2. Evidence for the importance of conveying the nutrition message was the large number of cases of hypertension and obesity.
3. Too many nutritional messages were delivered by general press, broadcasting and T.V.. The main objective of these messages was financial and not educational.
5. The committee on medical aspect of food policy took the leadership in evaluating knowledge through panels and reports in cooperation with the
Royal college of Physicians and other institutions.

6. The British Foundation carried out a survey of the current status of the course of nutrition in undergraduate and postgraduate medical training. The findings revealed that 41.1% of the schools had specific individuals to coordinate the training of nutrition. The majority of schools taught about nutrients sources, requirements, deficiencies and excesses and the role of diseases. There was no teaching of food toxicology and hygiene.

Passmore et al (1986) stated that "in medical schools nutrition is taught as part of the undergraduate courses of biochemistry, physiology, pharmacology, pathology, medicine, pediatrics, obstetrics, surgery, community medicine and dentistry. Teaching is diffused and thus uneven. Important aspects may be omitted, notably nutritive value of foods and the impact of food technology. Maternal and child health (MCH) centres in U.K. were designed to supervised the health of pregnant women and their children. But mothers of the social class IV and V tended to underuse the (MCH) centres services."

According to Redman (1968) the idea of educating mothers during pregnancy in U.K. goes back for centuries. In Manchester during the 18th century Dr.
Charles White wrote a book for mothers during pregnancy. During the last few decades of this century, understanding of the psycho-dynamics of pregnancy and puerperium has led to the establishment of scientific curriculum contents, and the structuring of antenatal and postnatal education. The widely recognized receptiveness of women in the third trimester to information about baby-care and behaviour led to the scheduling of prenatal classes at that time. Women in the first and second trimester did not exhibit the same level of interest in mothercraft. Therefore they were omitted from prenatal classes. Generally in prenatal education and instruction, each mother's understanding and ability would vary depending largely on her background and previous experience.
CONCEPT AND TRENDS OF NUTRITION EDUCATION IN SOME DEVELOPING COUNTRIES

Nutrition education in some developing countries, particularly the Arab's World is closely linked to and affected by the social status of women, traditions and customs. Such customs limited the role of women to indoor activities, the main aim of which was to prepare women to be ideal domestic housewives.

Traditional nutrition education was perceived as food preparation and cooking, conducted under the apprenticeship system; young girls learned at home from their mothers. Obviously there is great value in this system if mothers are educated in the area of food and nutrition. Because this was not the case, however much of the information on nutrition came to be provided by schools, adult literacy classes, mass media and M.C.H. centres.

Evidence from developed countries suggested that linking nutrition, health and family planning services is likely to increase the attractiveness and the effectiveness of each; in particular the attitudinal
changes resulting in a reduced rate of maternal mortality as well as receptivity for the idea that family size can and should be determined by a conscious choice. It is also known that although malnutrition affects all age groups its impact on mothers and their children is greatest especially in developing countries.

The researcher could not find any reliable literature on nutrition education in developing countries. Accordingly, a brief account of girls education in Arab's World with emphasis to some economics is given, as whenever this subject is taught it includes food and nutrition principles and concepts. Some information regarding the nutrition education status of some Middle East Countries is also given.

EGYPT

According to Wieszi et al (1969), the leading countries in the Arab World with regard to girls education may be Egypt and Lebanon. In Egypt the first formal education in family care including food and nutrition was the establishment of the Maternity school in (1831 - 1832). Some Sudanese women were among the student. In (1855) the Greek Community Girls School in Alexandria was assigned for teaching the household arts
including food and nutrition. Women's Technical School were established in (1937) with a four years educational programmes in the field of home economics. In (1954) all the technical schools were replaced by the Bolag High Institute for Home Economics in Cairo. The general theme of education for girls was a sort of general education together with home economic subjects, so as to prepare girls for secondary level education in home economics. During the period (1962 - 1972) a radical change in objectives and curricula took place; new branches of nutrition, institutional management and dress-making classes were established.

According to Galal (1986) nutrition education in health centres has been conducted since 1979 through a two-phase project, assigned to the Catholic Relief services. The project was planned to cover 1400 health centres out of the 2000 health centres in Egypt during the period (1979 - 1988). The curricula developed were mainly derived and modified from medical school curricula without much attention to testing their applicability. There were two components of nutrition education in health centres - namely growth monitoring
activity and institutionalization of these activities in the primary health care system.

LEBANON

According to Rushdi (1980) in Lebanon generally girls' education did not receive the necessary attention. But education in the field of catering was given due consideration because of the tourism industry and its impact on the economy of the country. This resulted in the establishment of the catering school in (1905) as the first catering school in the Arab's World. It had two divisions. The ordinary division with the elementary school certificate as an entry condition used to give a two year course in order to qualify for the ordinary certificate in catering. In the specialized division, the student spent a further third year after obtaining the catering certificate.

In 1921 greater attention was given to home economics education. This attention had a great effect in setting a firm and steady pace for the development of the subject of home economics as a formal subject at all levels of education in Lebanon.

NUTRITION EDUCATION IN MIDDLE EAST COUNTRIES

Hookham (1974) described the position of nutrition education in six countries in the Middle East as follows:
1. Nutrition education had been included at all levels of education in two countries. The other four countries included it in primary, secondary and primary teachers' training.

2. The six countries used local documentation, from local surveys and research to establish their educational objectives.

3. At all levels half of the countries taught nutrition as an interdisciplinary subject. One country taught nutrition as a subject in its own right as well as an interdisciplinary subject. The remaining three countries offered the subject on an interdisciplinary basis with no extra-curricular activities.

4. Most frequently in these countries nutrition was combined with natural science, home science, health education and agriculture.

5. Methods employed in teaching nutrition were problem solving topics - concept oriented approaches.

6. Educational materials used include text-books, radio, pamphlets and audio-visual aids.

7. At critical levels, primary and secondary nutrition education was given some attention - an average of 5.16% of the total contact hours at primary level and 1.9% of the total contact hours at secondary level.
8. Half of the countries employed teachers who were qualified in nutrition. The other half employed teachers who were qualified in general subjects.

9. Curriculum revision, specialized personnel and teacher training as well as realistic assessments of needs to establish a programme relevant to local conditions, were the greatest needs reported by the six countries.

So, nutrition education had become part of the general education programme in Middle East countries.

**HISTORICAL DEVELOPMENT OF NUTRITION EDUCATION IN THE SUDAN**

In the Sudan, the issue of nutrition is addressed through interdisciplinary programmes offered by several agencies without proper coordination or common objectives. Historically the teaching experience was perceived as an extracurricular activity that could be taught incidentally or on occasions.

Lillian (1982) reported that, "According to Sir James Currie, Director of Education (1900 - 1914) girls were to be educated to raise the standard of domestication in the home and to arouse women from their mental stagnation". Sanderson (1963) reported that in 1948 adult educational work spread as social welfare work started for women, including simple instruction in domestic science and food preparation.
Omer (1981) reported that, "In 1930 the British authority introduced cooking and sewing subjects into elementary schools. General education in Sudan started during the early period of Condominium Rule in non-formal way by teaching girls the arts of cooking and sewing in group in their own homes. Wives of Egyptians seconded for work in the Sudan played an important role in getting together the Sudanese ladies and helping them in instructions. Such group learning spread throughout Khartoum and from there to many parts of the Sudan."

According to a Ministry of Education report, in 1964 - 1968 a curriculum for home economics for the intermediate level was set. The Ministry of Education 1974 also reported that home economics should be introduced at all levels with emphasis on nutrition, child care and family relations. According to Khattab (1974), Zumravi (1982) and El Gerali (1986) - nutrition education undertaken by the Ministry of Education started with the establishment of a nutrition training centre in 1964. Its activities were as follows:

1. Training primary school home economics teachers.
2. Training of junior secondary school teachers.
3. Training of young women for a period of about three weeks.
4. Some of those who attended the above training courses are admitted to a two-year course to qualify for a diploma in nutrition and rural development.

El Gezoli (1983) and Khattab (1985) stated that both UNICEF and WHO had been involved in the evaluation of this division and offered financial and technical help to establish centres in most provinces. In 1972 the establishment of provincial centres started. The programme of these centres are directed towards imparting basic nutrition information and demonstrating food preparation using available local food items.

Khattab (1985) reported that the Ministry of health had two post-secondary institutions where nutrition is offered as part of the diploma course. One of these is the Khartoum Nursing College which offers a 3 year post secondary diploma in nursing and where the nutrition and dietetics curricula are emphasised. The other one is the College of Hygiene which offers nutrition and public health as part of the 2 year post secondary diploma.

Nutrition education in the Ministry of Health was
also reported by Younis (1972) and Zumrawi (1983) as follows: In 1966 a nutrition division was established through its field staff vital information regarding feeding patterns, nutritional status of pre-school children and weaning practices is continuously collected and integrated into the training programme of the health personnel.

Zumrawi (1982) reported that Omdurman Comprehensive Child Health Centre was set up in 1972 by the Ministry of Health. One of its objectives is to combine the principles of nutrition as preventive medicine with curative medicine in accordance with the National Primary Health Programme and that the new concept of imparting nutrition education through Nutrition Rehabilitation Centre had been developed by the Ministry of Health in 1972 in Buluk Hospital in Omdurman town. The primary objective was to take care of children with early and moderate stages of malnutrition and involve their mothers in their feeding and care.

Khattab (1985) stated that, University of Khartoum had no department of nutrition in any of the faculties. Nutrition is taught independently by various departments in the faculties of Agriculture, Education, Medicine and Veterinary Science. Zumrawi (1982) stated that in 1966 a department of Home Science was established in the faculty of Agriculture. It offered a
four year B.Sc course. In 1976 this department was transferred to faculty of Education. The main purpose behind this transferring was to provide qualified teachers in Home Science subjects including nutrition, in secondary school and teacher training institutes.

Khattab (1985) said; "In the faculty of Medicine nutrition is taught at by at least four departments: Biochemistry, Physiology, Community Medicine and Paediatrics. The number of hours allocated to teaching in the various aspects in these departments justify the creation of a coordinating nutrition department". Other institutions and universities that offer nutrition and food science listed by Khattab (1985) are:

1. Gazira University - Faculty of Medicine department of Biochemistry and Nutrition.
2. Omdurman Islamic University - College for girls - department of Home Economics.
3. Alfay University College for Girls - Department of Family Science.
4. Khartoum Polytechnic - College of Agricultural Studies - Division of Agricultural Technicians Shambat, Department of Home - Science.
5. Ministry of Health - Nutrition Division.

It is evident that several units are engaged in nutrition education and training.
Figure 1 Nutrition Training Institutions In the Sudan

Academic Qualifications

- Universities
- In Blue Nile Province
  - Crater
  - Rahadul Islamic University

In Khartoum Province

M.Sc. or Ph.D. Specialist in Nutrition

- AHWA (girls)
- Non-Specialist
  - Private
  - College

Khartoum University

Diploma in Nutrition

Faculties

- Education
  - Medicine
  - Agriculture
- Science
  - Biochemistry

B.Sc. Not in Nutrition

Diploma in Nutrition

- Nursing
  - College
- Institutions and Colleges (3 Years)
- Agriculture
- Studies

School of Hygiene (2 Years)

In Services Training
3 weeks to 6 months

School of Health Visitors

Health

Ministries

Agriculture

Rural Development

Education

Social Welfare

Extension Dept.

Employment

Community Rural Area

As-Village guide
Nutrition Guide-Educator

Community Health Workers - Health Visitors and Teachers and Officials

Food Proc.

Processng Centre

Primary Intermediate Schools

Provincial Nat. Level & Adult Classes

Centre

School Garden and Nutrition Edu. Division

* SGED: School Garden and Nutrition Edu. Division
The content of figure 1 based on the researcher's observations and personal communications (1968). It shows the training institutions, different graduates and trained personnel involved in delivering nutrition education. It can be seen that nutrition education and health visitors receive more or less similar nutrition training the content of which centres round: nutritional value of certain local foods, major nutritional diseases and food during pregnancy, lactation and weaning.

The B.Sc. - home science graduates are called nutrition officers and are involved in the teaching and training of nutrition guides and nutrition educators. Graduates of college of the Agricultural Studies are agricultural extensions agents - receive courses in food and nutrition through home economic and population education classes. They work in rural extension centres and in food processing centre.

Public health officers are engaged in environmental control aspects. Nurses confine themselves to the management of clinical cases of malnutrition in rehabilitation centres and hospitals.
Nutritional educational activities in (MCH) centres represent one of the major concerns of many nutrition educators. These activities were the subject of investigation for years by many nutritionists who made various efforts and placed differing emphasis on their goals, significance, functions and limitations. Nutritionists also gave examples of studies which demonstrated the impact of provision of nutrition knowledge on the nutritional status of women and their babies. Studies were also done to demonstrate nutritional needs as well as nutritional problems during pregnancy.

In this section an attempt is made to collect relevant data that may be of help in developing the philosophy, objectives, content, instructions and evaluation methods of the proposed programme.

The importance of nutrition education in M.C.H. centres is based on the fact that in the case of pregnant women, lactating mothers, infants, children and adolescents adequate nutrition is vital for their growth, promoting development and maintaining health and well-being. All these groups and particularly pregnant women are regular attendants at M.C.H. centres.
and therefore provision of knowledge at these places will have of greater benefits.

It is well known that the concept of education is rapidly changing from "schooling" to "life-long education". So it is believed that education, particularly in nutrition, can be acquired outside formal schooling programmed training, within all social contexts - in the family and wherever an individual is guided to respond to his or her cultural and socioeconomic environment in a positive manner. The F.A.O. (1977) recommended that the style and methodology of such education become as important as the formal content of a curriculum.

According to Jelliffe (1986), M.C.N. units of health services must form a major component of any national nutrition network. They are already trying to deal with the severely malnourished and with conditioning infections. They present a community - felt need for both mother and children and because of their curative functions, their staffs can achieve a special position of trust and acceptance.

Passmore et al (1986) reported that in the United Kingdom, mothers in lower social classes tend to underuse the (M.C.N.) centre's services and ways to bring them have to be found as among their children cases of rickets due to malnutrition are still seen.
In India Gopaldas (1987) said:

"Women have been found to be poor users of supplementary feeding programmes offered in (M.C.H.) centres. The reasons are many, social taboos, unimaginative food supplements and distance to (M.C.H.) centres".

Other reasons limiting women's access to (M.C.H.) centres summarized by Egan et al. (1980) include:

1. Lack of comprehensive philosophy or approach shared by those who plan and implement nutrition education as well as lack of agreement on the message.

2. Responsibility for nutrition education is scattered throughout a number of government and voluntary agencies. The result of this piece meal philosophy and approach are; conflicting messages, overlap and duplication which create confusion and apathy.

Egan et al (1980) suggested the following guidelines:

1. Provision of nutrition education which incorporates specific cultural and ethnic concern of all income groups in the population.

2. Nutrition messages should be tailored to the information needs felt by the target group.

3. Teachers and other providers of knowledge should be adequately trained to convey nutrition information effectively.
4. Efforts should be made to present nutrition information as part of a popular life style and consider factors such as the escalating number of women working, increase in group care of children and the increase of meals away from home.

5. Improve one to one nutrition counselling, making more use of the home environment e.g. follow up telephones calls, mass-media, community leaders and increased client involvement.

6. Pregnancy is considered a particular teachable moment. The prospective mother especially during her first pregnancy is receptive to information about optimizing her diet, breast feeding, wearing practices and providing the proper diet for her baby. A counselling format which can be adopted to the women's specific needs works best.

7. Nutrition education for pregnant women should include discussion on the physiological changes that occur in pregnancy, the relationship of nutrition to the mother's own health including dental health, and to the outcome of the pregnancy; the desirability of and average weight gain of 22-27 pounds; the extra nutritional needs of mother and foetus and how to obtain them, respecting socioeconomic and cultural differences; the importance of avoiding bad diets, reducing diets, alcohol, smoking and drugs. The
relationship of the pregnancy diet to breast feeding should be considered. Guidance to breast feeding should be initiated during pregnancy.

8. Pregnant adolescents require a special approach and should receive high priority for nutrition education.

9. Nutrition education messages for child care takers i.e. mothers or parents, daycare personnel.

10. Nutrition educators should make more effective use of the actual growth of the infants as an educational tool to demonstrate to parents the effect of nutrition care on health and well-being. The last need Egan et al (1980) listed is nutrition educators should make more use of research findings and results in order to identify the key "Turn on time" for various target groups and thus be able to promote more effectively attitudinal and behavioural change.

Sam and Robert (1981) described nutrition education programmes offered to mothers attending mother-nutrition centres in the Philippines. The objectives of the programme were:

1. Helping mothers to understand the relationship between food and health.

2. Training participants to plan, prepare and store foods in ways that conserve natural nutrition.
The criteria used to determine whether the objectives had been met were:

1. Weight for age of infants was compared with Philippines' standard.
2. Successful supplemental feeding was considered as appropriate if protein, fat, leafy green and yellow vegetable were present in the diet.
3. Cost effectiveness was calculated using the following formula:

\[
\text{UNNC} = \frac{\text{Cost of programme operation}}{N (-)} + N (+) \quad \text{UNNC} = \text{Unit measure of cost effectiveness}
\]

\[N (-) \quad (+) \quad N (+) \quad (-)\]

\[N (-) \quad (+) \quad \text{represent those individuals whose nutritional status improved over the life of the programme.}\]

\[N (+) \quad (-) \quad \text{those whose nutritional status deteriorated.}\]

Interpretation of cost effectiveness was difficult since participants were not randomly selected and no true comparison group was identified before initiation of the programme. Yet changes in nutritional status revealed, was attributed to programme activities.
PROJECTS OF MASS-MEDIA AND NON-FORMAL NUTRITION EDUCATION

Sara (1978) described mass-media non-formal education project in Tunisia, which was comprised of the educational communication, behavioural and evaluation domains. The educational objectives were:

1. Increasing consumption of fruits, vegetables, legumes and eggs.
2. Improving child feeding practices with emphasis on breast feeding.

Sixteen maternal child health centres were selected. Eight were designated as experimental and eight as control. Food consumption data for mothers and children was collected by the 24 hours recall method during home visits. Maternal nutrition related knowledge and attitudes were assessed. Economic status was determined based on such factors as size of the home, number of windows and husband's occupation.

For evaluation these questions were addressed:

1. To what extent were knowledge, attitude and diet changed?
2. Did the combination of radio and non formal nutrition education have a greater impact on changing knowledge, attitudes and behaviour (KAB) than either of the two alone?
3. What factors contributed to heighten impact of the programme? and
4. To what extent did mother's attitude changes in (KAB) to the programme?

Results of the evaluation revealed that most of the respondents did not report changes in (KAB). Radio messages were well received by the experimental low income, illiterate and semi literate malnourished families with young children. But the same was not true for the upper and middle class.

Gillian (1972) in Ghana described a nutrition education programme offered for three years to pregnant and nursing mothers in six communities in clinics. In this study the following concepts were emphasized:

1. The importance of food high in protein.
2. Introduction of supplementary food for infants between 4 - 5 months of age.
3. The importance of fruit in the diet.
4. The impact of good food on children's growth.

Methods used to introduce nutrition information were: talks, posters and cooking demonstration.

Evaluation of the programme was unable to demonstrate any improvement in the nutritional status as a result of nutrition education. There was limited success in mentioning adequate growth in preschool children. The following reasons were reported for the
limited success:
1. Inadequate interval time between the first nutrition lesson and the time when the new idea must be put into practices.
2. Ineffective teaching methods.
3. Over emphasis on expensive protein rich foods

Hoorweg and Mc Dowell (1979) described a nutrition education programme in Uganda as follows:

The programme was operated in a Nutrition Rehabilitation Centre for mothers and their children, the educational objectives were:
1. To alter mothers' knowledge, attitudes and behaviour, either directly or indirectly and through this change influence child health.
2. Two indicators were used to assess the nutritional status, these are:
   a) Standard weight for age.
   b) Recovery rate time based on weight gain.

Knowledge was assessed by a series of questions pertaining to the recognition of malnutrition. Attitudes were examined towards particular foods - by choosing six evaluative words pairs i.e. (good - bad; rich - poor, happy - sad, ideal - improper, important - unimportant, big - small) and four dynamic word pairs i.e. (strong - weak; brave - cowardly; quick - slow; active - passive). Each judgment is thereafter being
turned into ratings which in combination were designed to assess attitudes. Mothers were also asked to indicate the number of times a high protein meal was preferred to a low protein meal.

Findings showed that indicators other than nutritional status measures would be more appropriate for evaluating education programmes. It was found that education resulted in desired changes in nutrition knowledge and food preference as well as recognition of the symptoms of malnutrition.

However, evaluation of the methodology revealed that the use of ratings based on semantic differential seemed least sensitive, since they require an extreme change in attitudes e.g. from good to bad. Nevertheless the results showed an improvement in nutritional status with variations similar to those observed in attitudes. The results also indicated the important of socioeconomic and family influence on the recovery of the malnourished child.

In conclusion the author emphasized the need for process evaluation which investigate not only the improvement in health but why the observed effect occurred.

In addition to the studies mentioned above many scholars carried out work which helped in nutrition
curriculum development. Salmon (1983) formulated fundamental questions that should be asked and answered before any nutrition educational programme started:

1. Whom are we trying to teach?
2. What are we trying to achieve?
3. What teaching methods should be used?
4. Who take the approach to deliver the message?
5. What constitutes the healthy diet?

Salmon (1983) said: "It is widely desirable to present information about health and nutrition in a way that is easily understood, thus ensuring that people are aware of the risks or the benefit of various actions leaving it to them to make their own choice".

Obviously answers to the questions above will reveal the four tasks of curriculum development and various answers to those questions could be obtained according to different localities.

However, most of the curricula available for review were organized around goals and objectives. Yet there are universal nutrition messages that help to formulate nutritional lesson content. Examples of these are the following six messages given by Greaves and Donoso, in (1976):

1. Breast feed your child as long as possible.
2. Feed your child only clean food, clean water,
given with clean hands from clean utensils. Keep flies away from food.

3. Should your child fall ill, seek immediate help from available services. If diarrhoea sets in, give your child immediately and repeatedly sugared water or weak tea.


5. If you are expecting or nursing a child you should eat more, at least 4 times a day, with plenty of dark green or yellow vegetables.

6. Two or three healthy children are enough. Space your children for your own and for their sake at interval of 2 to 3 years.

Some nutritionists went further and formulated specific dietary guides for prosperous countries and for poorer countries. Example of these were reported by Passore et al. (1986) as follows:

1. Eat a variety of foods.
3. Avoid too much saturated fat and cholesterol.
4. Eat food with adequate starch and fibre.
5. Avoid too much sugar.
6. Avoid too much salt.
7. If you drink alcohol, do so in moderation.

Nutritionists everywhere approve these guidelines except that many consider that healthy citizens do not need to worry about their cholesterol intake. Obviously
these guidelines are totally irrelevant to peasant farmers and the masses who live in shanty towns in Africa or Latin America. Passmore et al (1986) suggested the following guidelines for poorer communities:

1. Insure that infants, after weaning and toddlers get a daily supplement of a concentrated food such as a mixture of cereals and beans or pulses.

2. If your water supply is not safe, boil your drinking water. If in any doubt, boil that given to infants.

3. Eat a varied diet and include pulses, green leafy vegetables daily and fruits in season.

4. Take milk, eggs and fish or meat whenever possible.

5. See that the kitchen is clean.

6. Store food away from flies, rat and mice.

There is no objection to these guidelines since the top priorities in many poor countries are good, clean food for young children and safe drinking water. Guideline No. (4) may require government action such as income equal distribution, rationing, subsidizing and control of the black market, in Khartoum.
INTERNATIONAL EFFORTS TO ESTABLISH NUTRITION EDUCATION WITHIN HEALTH RELATED FIELDS

The information presented here reflects data gathered from surveys undertaken in most World Health Organisation regions by the International Union of Nutrition Science (IUNS) and other institutions during the period (1975 - 1985) regarding training in nutrition in school of medicine, nursing, public health, nutrition and dietetics and a few of dentistry and pharmacy. Additionally more recent information has been obtained from the Food and Agriculture Organization regarding the introduction of relevant nutrition subjects in agriculture curricula.

Jelliffe (1986) gave a full account of the above mentioned surveys as follows: In 15 medical schools in Africa and in 8 Asian countries nutrition was taught as an integrated subject, with biochemistry or physiology and with some clinical work. Usually nutrition questions were not incorporated in examinations. Frequently it is an elective course. However in 37 Japanese medical schools subjects such as food production, cooking instruction and commercial catering were taught. In Mahidol University in Thailand, community nutrition and health programmes, 26 hours of instruction was included in a 6 weeks programme. In Tanzania and Indonesia community nutrition courses were
taught and students spend 2 - 3 weeks working in villages. This system was found to be a favourable method to promote the acceptance of the concept of primary health care programmes.

Jelliffe (1986) stated that: "Nutrition training in most countries was not geared to the need of the community. Training was subject oriented rather than community oriented. Length of training auxiliaries is a two year or less. In most countries the number of trained auxiliaries surpassed the number of trained nurses. For example in the Sudan in 1975, there were 8,112 nurse auxiliaries and 187 trained nurses.

With regard to nutrition education in schools of home economic Jelliffe (1986) reported, "responses from 43 out of 125 countries surveyed, revealed diversity in type of programmes, admission requirements, length of total training and the tasks for which personnel should be trained in order to obtain employment. University degree programmes predominate and seven other categories such as technical institutes, hospital school and vocational schools".

Data regarding curriculum contents was identified for community or public health nutrition as fellows: Basic science (25%) food and nutrition (35.4%) social and economic science (10%) educational science (5%) and public health science (25%).
In this survey Jelliffe (1986) reported that, under the auspices of the Food and Agriculture Organization a guideline had been developed to assist agricultural officers to estimate the impact of food production on the nutritional status of population and the prevention of nutritional diseases that are of public health importance.

A teacher's manual and students hand book for use in South East Asia were developed in 1984. A field programme and management, "Food and nutrition" training Pack (1982) as well as guidelines for agricultural training curricula in Africa (1982). The Food and Nutrition Journal (V. 10 - 2) 1982 is devoted entirely to training agriculturalists in nutrition. The manuals are excellent examples of the needed multidisciplinary cooperation required.

Jelliffe (1986) pointed out that in most parts of the world teaching nutrition is not compulsory and the subject is not present in qualifying exams. However in some countries some improvement has been noted. For example, in a survey of 10 Canadian dental schools in 70% of them nutrition was taught as separate course, in 40% it was integrated into the curriculum and in 40% a clinical nutrition practicum existed.
SUMMARY

In this chapter the historical development of nutritional concepts efforts towards establishing nutrition in developed as well as developing countries and field studies related to the present study were described.

In developed countries it seemed that all (M.C.R.) centres, secondary schools, many colleges and most of the mass-media had attempted to include nutrition education activities, to create public awareness about nutrition and malnutrition problems.

In developing countries nutrition is taught as an interdisciplinary subject, integrated with home economic subjects of as an extra curricular activities.

Nutrition education in the Sudan is undertaken by many agencies without proper coordination or common objectives. The Ministry of Education has no set curriculum for nutrition education at the different school levels although home economic subjects are recommended.

In general nutrition programmes in (M.C.R.) centres are characterized by their flexibility, informality, diversity and teacher-learner involvement.
CHAPTER III

METHODOLOGY
The study involved the following populations:

**POPULATION I**

Consisted of pregnant women in their fourth month of pregnancy, attending Omdurman Comprehensive Child Health Centre. All members of this population were Sudanese from different parts of the Sudan but lived in Omdurman. About 80% of them lived in the Umbadda slum area, 15 miles away from the Comprehensive Child Health Centre and about 2 miles from the public transport centre. They were unemployed housewives and their ages ranged between 18 - 33 years. 70 of the total number were illiterate.

**POPULATION II**

This population consisted of pregnant women in their fourth month of pregnancy, attending Khartoum Model Clinic for maternal Child Health Centre. They came from different areas. The clinic receives women and their children every day except Friday, from 7:30 in the morning up to 1:30 p.m. for various services such as regular medical check up, prenatal care,
willingness and enthusiasm to cooperate, that they were eager for knowledge about nutrition and food. Their positive attitude was clear from their frequent inquiries and their invitation to the researcher to come to their home and discuss with them nutritional problems that existed among children and adults in their area. This attitude was of great help to the researcher in collecting the desired data. Approximately 60% of the total sample were from suburban areas of Khartoum namely Umbarra, El Giraf Sharig and Kuku, 20% from the centre of Khartoum namely El Saggana, El Deim El Shargia and Khartoum 2; 20% from Khartoum North, Shambat town and Omdurman. The original home region of the whole sample was as follows: 37% of the two groups was from Khartoum Province; 23% Southern Kordofan; 18% from Northern Province; 13% from North Kordofan; 7% from North Darfur; 2% from the Southern Regions.

**Sample III**

This was a subsample, consisting of 10 pregnant women. They were chosen from sample II after they showed willingness to participate in weighing and recording their food intake for one day. The main purpose of weighing and recording food intake was to calculate the dietary intake quantitively and compare it with the standard dietary allowances.
SAMPLE IV

This sample was selected from population III. It consisted of nutrition officers, directing nutrition activities in maternal and health care centres. They were supposed to be nutritionally oriented as they had graduated from either the Faculty of Education, Department of Home Science or Ahfad College for Women, Department of Family Science. Any one of them who was available in Khartoum Province at the time of the study was interviewed. The total number of the sample was 20.

SAMPLE V

This was drawn from population IV which was small in size, comprising all the nutrition education experts in Khartoum Province. They were:

1. Head of home science department - Faculty of Education - University of Khartoum.
2. Head of department of Community Medicine - Faculty of Medicine - University of Khartoum.
3. Head of department of Biochemistry - Faculty of Agriculture.
4. Head of department of Gynaecology - Faculty of Medicine - who was also director of Khartoum Medical Clinic for Maternal/Child Health Care.
5. Deputy director of Nutrition Division, Ministry of Health.
6. Director of School Gardening and Nutrition Education Division (SGEED) - Ministry of Education - Khartoum.
7&8. Director of College of Hygiene - Ministry of Health and director of Women's Extension Section.
9. Director of the Nutritional M.C.M./Family Planning Project for Improvement of health of Mother and Children.
10. Director of Omdurman Maternal Hospital.
12. Head of Family Science Department - Ahfad College for Women - Omdurman.

METHODS OF DATA COLLECTION

Gathering, processing and interpreting of nutrition data is very complex because eating and feeding behaviour, are basic interpersonal actions between people. Therefore deciding on the appropriate instrument i.e. the best survey or research method required a preliminary analysis of the kind of information needed and sources of such information. The following tools and instruments were used to collect the needed data.

QUESTIONNAIRES

Three questionnaires were designed in English to elicit information related to questions of the study. The three questionnaires were designed by the researcher, who also did the interviews and conducted
the fieldwork. The content of the questionnaires were revised by education experts. A reliability check of questionnaire I was achieved through a pre-testing study, which was carried out on pregnant women attending Omdurman Comprehensive Child Health Centre. Improvements were made accordingly.

The three questionnaires were addressed to samples I, II, III and IV. These questionnaires were introduced in the form of oral interviews using simple Arabic language. Responses were recorded immediately and exactly by the researcher.

Items of questionnaires I, II, and III are given in appendices I, II and III respectively.

**QUESTIONNAIRE I**

This questionnaire was addressed to pregnant women (sample I and II). It included five sections covering the following areas:

- **Section A:** General and health information.
- **Section B:** Dietary habits and food beliefs.
- **Section C:** Socioeconomic data.
- **Section D:** Pre and post nutrition tests format.
- **Section E:** Food record format.

Each section was composed of items and subitem that had been carefully selected and objectively formulated to yield relevant answers to most of the questions of the study. As for other questions of the
study their answers corresponded to responses for items of questionnaires II and III.

Section A: General and Health Information

Consisted of 11 items, some of which are divided into subitems. Items 1 to 9 yielded information on the general characteristics of respondents, i.e., pregnant women and lactating mothers involved in the study.

Items 10 a and b described health conditions as perceived by the respondents and this corresponded with a part of question 5 of the study.

Items 11 a and b showed height and weight gain and this corresponded with a part of question 9 of the study. Items 11 c, d, e, f, and g presented the results of the biochemical findings.

Section B: Dietary Habits and Food Beliefs

This part of the questionnaire consisted of 17 items and subitems. Yielding information on the kind of food preferred as well as food avoided during pregnancy. It also yielded information that will show which members of the family is served first.

Section C: Socioeconomic Data

This part of the questionnaire included 15 items, describing the educational level, occupation and family
income as well as giving information on the characteristics of and facilities available in the households.

Section D: Pre and Post Nutrition Tests

The plan for development of the pre and post tests as an instrument for measuring the nutritional knowledge of respondent, was adopted from rules for construction of nutrition tests offered by Schwartz (1976), Eppright (1975) and Gronlund (1968).

The tests were based on three broad nutrition concepts - source of nutrients as well as dietary habit and beliefs - experience in meal selection and food production in the household.

The wording and content of the tests were compared with some tests given to elementary school teachers, while participating in a three month training course, entitled "Rural Development". It was organized by the School Gardening and Nutrition Education Division, Ministry of Education. Also a panel of 3 nutrition education experts and 5 nutrition officers reviewed and approved these concepts, as very important to the understanding and application of nutrition knowledge. The panel and the researcher, felt that knowledge of the nutrient and their functions, was of less importance than concepts of food and food selection factors. Therefore the following objectives were
selected to reflect basic knowledge rather than an advanced level of nutrition knowledge. These objectives were identified in the cognitive, affective and behavioural domains - adopted from Korin and Sim (1981) and displayed as follow:

At cognitive level the respondent in the experimental group should:

a) Understand the concepts of nutrition.
b) The respondents will recognize the food source of the nutrients, iron, protein and calcium and possibly folacin.

At the affective level the respondents at the end of the post test should:

a) Understand the uses of the food group in planning and selection of daily meals.
b) The respondents will become aware of types of food that may affect health.
c) May be able to identify a need to improve her food habits.

At the psychomotor perceptional skill and behavioural level, the respondents:

a) Should be able to demonstrate through verbal or written reporting and group commitments an improvement in the consumption of some food e.g. green vegetable.
b) Be able to participate in monitoring her baby's nutritional status and appreciate the use of growth charts.

c) In future the respondent may be able to plot her weight gain during pregnancy and compare it with standards.

Other purposes of performing the pre and post tests were as follows:-

1. To identify the specific weakness or gap in the nutritional knowledge of the respondents.

2. The pre-test helped the researcher in selecting those who committed themselves to participate in the nutrition educational programme.

3. Final results of the tests were used as a means to assess the impact of the educational programme. Therefore results of the tests could be used as performance assessment devices to evaluate the extent to which the desired objective of the programme have been achieved.

4. On the basis of the results of the pre-test areas of nutritional knowledge that needed emphasis were identified for developing the programme - learning experience content and so were the educational materials needed for the programme.

However such instruments, which measure theoretical knowledge skill, do not determine the
extent to which the respondents will apply what they have been taught. Yet the researcher, with well defined educational objectives and final goal of sparking nutritional awareness, will be content with these instruments for evaluating the programme's operational method and specifically the face to face nutritional counselling lessons. Fanslaw et al (1981) said:

"The information obtained with valid and reliable achievement test and tests that accompanying nutrition education curricula provide a means for measuring the level or change in level of nutrition knowledge of the students".

In this particular study the detailed measureable instrument was the pre and post tests. Each consisted of 20 questions, comprising attitude scales and questions related to respondents' nutrition knowledge level. These items were divided into subitems and all form one unit of section D, questionnaire I. For details see appendix I.

The first 10 items yielded information concerning nutrition knowledge of the respondent before nutrition counselling and exposure to pamphlets and then measure nutrition knowledge after exposure.

Specifically, the knowledge test was about concept of the word nutrition, nutrients sources and nutrients function as well as balanced meal planning using the basic four food groups. Particularly Item 9 consisted
of a drawing of various foods and the respondents were asked to select food that will make a balanced diet. The idea of using a drawing was adopted from Cooper and Murray (1974) who used the balanced meal approach using the four food group system rather than the recommended daily allowances. Cooper and Murray (1974) said:

"In programmes designed for higher grades, we emphasize the balancing of the total day's intake. At primary level, teaching balanced meal selection is our primary goal, since it provides a good foundation for nutrition education at the junior level".

In this study since there were illiterate women a meal selection approach was used.

Items 11 - 20 yielded information concerning nutrition attitudes and beliefs related to feeding pattern, weight gain, eating strange things and food production in the household. For the purpose of the study, the definition of the word attitudes adopted is that of Redman (1968) "Learned, emotionally toned predisposition to react in a particular way toward something".

Criteria for constructing some statements of this part of this test, were adopted from research done by Penner and Kolas (1983) and Gillespie et al (1983) — where respondents were asked to respond to some statements by indicating their agreement or disagreement. Agreement responses for items 11 - 20 with exception to item (17) were given (5) points which is the full mark. Disagreement in item (17) was given
(5) points.

**Section E: Food Record Formats**

A food record as described by Sanjur (1981) is "a dietary method used at the individual level whereby a record of food is obtained by interview or self-administered questionnaire employed often in the clinic or community setting. Food records were based on food eaten by the individual, kept by weights, household measurements, or by estimated quantities over a stated period of time". So in this study a food record format was designed and given to (10) respondent (sub sample) from sample II during pregnancy and after delivery. This food record formats consisted of three columns. Each respondent was asked to give an account of all foods she had eaten during the previous 24 hours and to record the amount by measuring it using household measures such as a cup, a spoon etc.

**II Tool III: QUESTIONNAIRE NO. II**

This questionnaire was designed to elicit information from lactating mothers who were pregnant women. It included 17 items most of which were divided into subitems and divided into four sections:

Section A: Infant feeding and weaning practices.
Section B: Infant nutritional status.
Section C: Dietary habits and food beliefs.
Section E: Nutrition pre-post-test formats.

For details see appendix II.
II Tool III QUESTIONNAIRE No. III

It was designed and addressed to sample IV i.e. the nutrition officers working in (M.C.H.) centres. This questionnaire consisted of 10 items, divided into sub-items. All items focused on the type of nutrition activities performed in (M.C.H.) and their activities, plan, procedure of implementation and ways of measuring impacts of the activities performed. There were also items that were intended to collect data on nutrition officer’s qualifications and their plan to improve their performance. For details see appendix III.

IV Tool IV: INTERVIEWS
INTERVIEW NO. I

Was a structured interview guided by a set of questions to nutrition education experts. The questions covered main areas of the educational programme development - objective formulation, selection and organization of the learning experiences and evaluation procedures.
For detailed information see appendix "IV".

INTERVIEW NO. II

This interview was designed for collecting dietary and socioeconomic data from pregnant women. It began in informal meetings with respondents in Omdurman Comprehensive Child Health Centre and in Khartoum Model
Clinic. A brief introduction about the purpose of the meeting was given. It included research objectives, future plan of implementing the programme as well as the need for their cooperation and support. Each respondent was asked on a personal basis. The local dialect of Arabic was used. During every visit the interview was carried out to fill in the questionnaire items and to conduct the pre and post test as well as conduct nutrition counseling with the experimental group. Respondent from the two group were not told that there were pre and post-tests. Respondents were given ample time to respond and if any one was in a hurry to leave the clinic the interview was interrupted and continued in a subsequent visit. The format were kept by the researcher. Factual knowledge such as home address, husband address, were checked with the clinic health records. At the end of the first interview each respondent was given a participant card and the researcher kept a duplicate one. Responses were recorded immediately as stated in the questionnaire.

Since the interviewer, i.e. the researcher and the respondent interviewed were both present as the questions were asked and answered-Sellitiz et al (1966) stated, there was opportunity for greater flexibility in obtaining information.
It was a constructed interview addressed to sample IV i.e. nutrition officers working in maternal/child health centres. The researcher in non formal visits met the nutrition officers, in 7 (M.C.H.) centres. Each one was given a copy of the questionnaire and asked to read it and answer, while the researcher was waiting for any enquiries or clarification. The researcher stated the purpose of the study and emphasised to them that the information gathered was needed for research.

OBSERVATIONS

OBSERVATION 1

Participant observation was carried out by the researcher during her regular visits to Cndurman Comprehensive Child Health Centre for three successive months. The purpose of the observation was an explanatory one, to become acquainted with the health personnel and to find out what type of nutrition activities were performed.
During the meetings in the clinic or home visits which had been undertaken during the fieldwork, any strange food habits were noted. The whole period of the field work was 16 months. So the observation could be called participant observation and spot observation by the researcher who used to record immediately strange behaviour relating to the feeding pattern of respondents.

During the first 3 months of fieldwork, the researcher made regular visits to Omdurman Comprehensive Child Health Centre and used to stay from 7:30 a.m. to 12:30 p.m with midwives in the health visitor's office observing all activities performed.

Observation in Khartoum Model Clinic took the whole period of the fieldwork, i.e. 13 months and after that frequent visits were made for monitoring weight gain during pregnancy as well as for growth monitoring of the babies up to the age of 6 months.

Observation in the homes was casual and informal during which questions related to the feeding method, child birth practices, ritual food, food symbolism, food ideology, food consumption motivation and factors that affect food consumption were introduced.

Observation was also extended to activities associated with health and nutrition.
performed in leisure time and the confinement period. Such traditions include dukhan - a kind of fumigation with dried pieces of talh or "Acacia Sowel". During this practice women drink a lot of milk if available, if not lemon juice or sorghum pap-gruel. It is believed that this practice is important for the uterus to regain its original size and it is also important for increasing milk production.

During home visit infant’s birth weights and heights were measured by the researcher using the Salter-Model scale for weight measurement. The standardized (AHRTAG) board scale was used for measuring the height.

During these home visits enquiries were made using the constructed questionnaire II. (Appendix II)

Every respondent was urgently asked to come after confinement to the clinic for immunization of the infant and growth monitoring. Any respondent who failed to report to the clinic in the appointed date was visited by the researcher at home to find out the cause, the researcher measured the weight and height of the baby and tried to solve the mother’s problem. Some money as an incentive was given to those who said that they could not attend because of financial problems. Infant growth monitoring was done up to the age of 6 months.
PROCESS OF DATA ANALYSIS

Process of data analysis involved a descriptive procedure of all steps of analysis and measuring namely:

1. Categorizing.
2. Tabulation.
3. Manipulation.

Summarizing took the form of relationships, trends and patterns that would yield answers to the questions of the study. According to this descriptive procedure, every item included in the questionnaire and formats was presented.

Tables were designed to present numbers and percentages of responses. When responses exceeded 50.0% they were considered as a majority. Responses that exceeded 80.0% were considered an overwhelming majority. Responses that were less than 10.0% were treated as insignificant minorities.

Figures were drawn to describe infant nutritional status.

Food intake of pregnant women and lactating mothers was calculated qualitatively in several ways. Steps involved in food intake analysis were as follows:-
Analysis of the 24 hour recall method was done using Nawar et al. (1974), procedures where foods consumed the previous day were grouped into four food groups. Energy rich food, meat group, milk and milk products group and vegetables and fruits groups. A mark of (3) was given for each group per meal.

A total score of 36 was given for the whole day for three meals and every meal contained the four groups. Any meal is given 3x4 if it contains the four groups.

Final appraisal marks as modified from Eltullaway (1975) was used as an indication of food intake status.

Calculation was done as follows:-

A/ for one food group per 3 meals
3x3 = 9
for all food groups
4x3x3 = 36/day/3 meals

B/ marks out of 36 described the appraisal as follows:-
-12 Poor
+12 - 24 Fair
+24 - 36 Good

The respondents were grouped according to this appraisal to describe their food intake.
It worth noting that Beaton et al (1979) had examined sources of variance in the 24 hour method and concluded that "Provided that group size is reasonable good estimates of food average intake can be obtained from the 24 hours recall data.

Secondly, food intake of the respondents was determined by estimating the amount of and kind of food eaten, and compared with the form of the four food groups and number of servings recommended for pregnant women.

Thirdly calculation of the nutrients value for the subsample i.e the 10 pregnant women who were asked to record and measure the food intake for one day. The nutrient value of food was calculated using F.A.O. food compositions tables for Africa, means values given by Sukar (1985) and by the Nutrition Division, Ministry of Health and Food Processing Centre (1986).

The final results were compared with the daily recommended allowance reported by FAO/WHO (1973). An expert with a social statistical background helped in the analysis and reporting of the results. The computerized Statistical Packages for Social Science (SPSS) - Nia et al (1975) was used.

Results of the analysis of questionnaire III addressed to nutrition officers - sample IV - were presented in
tables showing numbers and percentages of responses.

Results from the interview guidelines addressed to nutrition education experts were presented in number, percentages and frequency. Some responses were stated in narrative form by summarizing responses gathered and drawing conclusions.

Some results of previous research and current nutrition information gathered were interpreted and used as a learning guide to formulate questionnaire nutritional and social data. Such data provided a careful study of pregnant women and lactating mothers and hence it is hoped that it will be possible to identify areas of food habits that needed to be modified as well as identifying factors that motivate acquisition of nutrition knowledge which is the main objectives of the proposed educational programme.

Such data was also of great help in performing four major tasks of programme development, i.e. educational objectives - selection and organization of the learning experience effectiveness and efficient organization of the learning experiences and evaluation procedures.

**SUMMARY**

In this chapter primary data sources i.e. population and samples selected were described.
Khartoum Province was selected as the site of the study.

Khartoum Model Clinic was used for conducting the research field work for a duration of 16 months.

Several instruments and methodological tools, notably constructed questionnaires, pre and post tests, interviews, constructed and unconstructed observations, home visits and follow up techniques, were all employed to collect the needed data. Tabulation, figures, T-test formulate and multiple analysis were used for analysing the collected data.
CHAPTER IV

ANALYSIS, RESULTS, DISCUSSION AND THE EDUCATIONAL PROGRAMME
CHAPTER IV
ANALYSIS, RESULTS, DISCUSSION AND THE EDUCATIONAL PROGRAMME

This chapter consists of three parts:

Part I is devoted to the presentation of the results of data collected from the various samples.

Part II is devoted to a discussion of the results in relation to the questions of the study, which covered four main tasks of programme development.

Part III gives a full account of the theoretical process of programme development. It also describes the nutrition educational programmes that had been performed in Khartoum Model Clinic for Mother/Child Care.

PART I

Sample I consisted of 60 pregnant women attending Omdurman Comprehensive Child Health Centre. The study of this sample was discontinued, due to the difficulty in tracing women's homes, so the results mentioned were not presented.

The following findings present an analysis of all items collected from sample II. This sample was composed of 120 pregnant women attending Khartoum Model Clinic for Mother/Child Care.
Table 1: Home Origin of the Respondents

<table>
<thead>
<tr>
<th>Region</th>
<th>Experimental n= 60</th>
<th>Control n= 60</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Khartoum Province</td>
<td>25</td>
<td>41.7</td>
</tr>
<tr>
<td>South Kordofan</td>
<td>15</td>
<td>25.0</td>
</tr>
<tr>
<td>North Kordofan</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Southern Darfur</td>
<td>5</td>
<td>8.3</td>
</tr>
<tr>
<td>Central</td>
<td>6</td>
<td>10.0</td>
</tr>
<tr>
<td>Northern</td>
<td>5</td>
<td>8.3</td>
</tr>
<tr>
<td>Equatoria</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Eastern</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>60</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 1 shows the home origin of the respondents. 41.7% of the experimental and 31.7% of the control group stated that Khartoum Province was their place of origin, while 25.0% of the experimental and 21.7% of the control stated that South Kordofan was their place of origin. 21.7% of the control and only 8.3% of the experimental came from Northern Kordofan Province. From Southern Darfur came 10.0% of the control and 8.3% of the experimental. 10.0% of the experimental and 6.7% of the control came from the Central Province. From the Equatoria Province - from Southern regions - came 3.3%
of the control and 1.7% of the experimental group and only 1.7% came from the Eastern Province - Fort Sudan.

Table 2 describes the general characteristics of the respondents. The overwhelming majority - 98.3% and 96.6% of the experimental and control groups respectively were Muslims. Regarding age 83.0% of the experimental and 81.7% of the control had ages ranging between 18 - 38 years and only 10.7% of the experimental and 18.3% of the control had ages ranging between 38 - 45 years. Concerning the number of years of marriage it was observed that 76.5% of the experimental and 46.6% of the control had a range of less than one year to 5 years since marriage. 20% of the control had 8 years of marriage, while 10% of the experimental and 13.3% of the control had 14 years and above since marriage.
Table 2: General Characteristics of Respondents

<table>
<thead>
<tr>
<th>Religion</th>
<th>Experimental</th>
<th></th>
<th>Control</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Muslim</td>
<td>59</td>
<td>98.3</td>
<td>59</td>
<td>96.7</td>
</tr>
<tr>
<td>Christian</td>
<td>1</td>
<td>1.7</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td>60</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age in Years:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 24</td>
<td>26</td>
<td>43.3</td>
<td>16</td>
<td>26.7</td>
</tr>
<tr>
<td>25 - 38</td>
<td>24</td>
<td>40.0</td>
<td>33</td>
<td>55.0</td>
</tr>
<tr>
<td>39 - 45</td>
<td>10</td>
<td>16.7</td>
<td>11</td>
<td>18.3</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td>60</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Years of Marriage:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1</td>
<td>2</td>
<td>3.3</td>
<td>5</td>
<td>8.3</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>16.7</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>25.0</td>
<td>5</td>
<td>8.3</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>13.3</td>
<td>6</td>
<td>10.0</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>18.3</td>
<td>10</td>
<td>16.7</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>5.0</td>
<td>3</td>
<td>5.0</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
<td></td>
<td>9</td>
<td>15.0</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
<td>8.3</td>
<td>12</td>
<td>20.0</td>
</tr>
<tr>
<td>14+</td>
<td>6</td>
<td>10.0</td>
<td>8</td>
<td>11.3</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>99.9</td>
<td>60</td>
<td>99.9</td>
</tr>
</tbody>
</table>
Table 3:

Distribution of respondents by Number of Family members living with them

<table>
<thead>
<tr>
<th>NO. of Members living with respondents</th>
<th>Experimental NO.</th>
<th>%</th>
<th>Control NO.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>14</td>
<td>23.3</td>
<td>11</td>
<td>18.3</td>
</tr>
<tr>
<td>1</td>
<td>21</td>
<td>35.0</td>
<td>20</td>
<td>33.3</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>21.7</td>
<td>19</td>
<td>31.7</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>8.3</td>
<td>3</td>
<td>5.0</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>3.3</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>5.0</td>
<td>4</td>
<td>6.7</td>
</tr>
<tr>
<td>6+</td>
<td>2</td>
<td>3.3</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>99.9</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3b shows the distribution of respondents with regard to the number of members other than the nuclear family living with them. 23.3% of the experimental and 18.3% of the control had nobody living with them, while 35.0% of the experimental and 33.3% of the control had at least one member living with them. 21.7% of the experimental and 31.7% of the control had two members. About 20.0% of the experimental and 16.7% of the control had a range of 3 to more than 6 members living with them.
According to the investigator’s assessment 43.30% of the experimental were healthy, 31.7% were not healthy and 25.0% looked pale. 48.3% of the control group looked healthy, 30.0% of them were not healthy and 21.7% looked pale.

Table 4 shows the biochemical investigation of the two groups. 99.3% of the experimental and 95.0% of the control group had a haemoglobin concentration below 11 gm/100 of blood and this according to the WHO (1972) standard was considered anaemic.
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HB (g/100)</strong></td>
<td>11.65</td>
<td>7.0</td>
<td>11.7</td>
<td>1</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>10.90</td>
<td>31.0</td>
<td>51.7</td>
<td>21</td>
<td>35.0</td>
</tr>
<tr>
<td><strong>Albumin (g/100)</strong></td>
<td>9.02</td>
<td>22</td>
<td>36.6</td>
<td>36</td>
<td>60.0</td>
</tr>
<tr>
<td><strong>Malaria + ve</strong></td>
<td>21</td>
<td>35.0</td>
<td>17</td>
<td>28.3</td>
<td></td>
</tr>
<tr>
<td><strong>Hookworm + ve</strong></td>
<td>15</td>
<td>25.0</td>
<td>17</td>
<td>28.3</td>
<td></td>
</tr>
</tbody>
</table>

* WHO Expert Committee on Anaemia (1972) considered anaemia to exist in pregnant women whose haemoglobin concentration is 11.0 g/100 ml of blood.
Table 5:
Distribution of Respondents by Mean height/crn
and weight gain/kgm during pregnancy

<table>
<thead>
<tr>
<th>Weight gain (Kgm)</th>
<th>Experimental No.</th>
<th>%</th>
<th>Control No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.50 - 2.00</td>
<td>3</td>
<td>5.0</td>
<td>4</td>
<td>6.7</td>
</tr>
<tr>
<td>2.50 - 3.00</td>
<td>7</td>
<td>11.7</td>
<td>13</td>
<td>21.7</td>
</tr>
<tr>
<td>3.50 - 4.00</td>
<td>12</td>
<td>20.0</td>
<td>15</td>
<td>25.0</td>
</tr>
<tr>
<td>4.50 - 5.00</td>
<td>20</td>
<td>33.3</td>
<td>11</td>
<td>18.3</td>
</tr>
<tr>
<td>5.50 - 6.00</td>
<td>12</td>
<td>20.0</td>
<td>14</td>
<td>23.3</td>
</tr>
<tr>
<td>6.50 - 7.00</td>
<td>3</td>
<td>8.3</td>
<td>3</td>
<td>5.0</td>
</tr>
<tr>
<td>7.50 - 8.00</td>
<td>1</td>
<td>1.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Height (cm)</td>
<td>153.0</td>
<td>100.0</td>
<td>153.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 5 shows the distribution of respondents of the groups by ranges of their weight gain during pregnancy. The respondents were grouped into seven categories. 25.0% of the control and 36.0% of the experimental group had a weight gain ranging between 3.50 - 4.00 Kgm; 33.3% of the experimental and 18.3% of the control group had weight gain ranging between 4.50 to 5.00 Kgm. 23.3% of the control and 20.0% of the experimental group had a weight gain of between 5.50 -
6.0% Kgms. 8.3% of the experimental and 5.0% of the control had a weight gain ranging between 6.50 - 7.00 Kgms. while only 1.7% (one respondent) from the experimental had a weight gain of 8.0 Kgms.

Table 6 shows recorded foods and drinks that were preferred during pregnancy and the reasons given for preference. Lemon juice was found to be most preferred item as reported by 93.3% of the control and 70.0% of the experimental group. Reasons given by these respondents were that it was healthy and nutritious. 50% of them from the control and 95.5% of them from the experimental reported lemon juice as being preferred because it was healthy, while 95.5% of the experimental and 92.4% of them from the control said it was nutritious.

70% of the respondents in both groups preferred eating cheese during pregnancy and the reason given by them was craving as reported by 65.2% from the experimental and 76.7% from the control. 19.3% of them from the experimental reported that they liked cheese.

68.4% of the respondents in both groups preferred eating biscuits during pregnancy, the majority of them - 48.0% from experimental and 48.0% from the control-
mentioned that the reason for preferring eating biscuits was that they were nutritious. The main reason given was craving. Salted, dried fish, usually cooked with sauce, hot pepper, oil and peanut butter was found to be preferred by 58.3% from the experimental and 78.3% from the control. 88.9% from the control and from the experimental reported craving as the main reason for preference.

65.0% of the respondents in both groups preferred eating tomato salad during pregnancy. The majority of them mentioned availability as the main reason—mentioned by 85.5% the experimental and 75.0% of the control group.

65.5% of the respondents in both groups preferred eating hot pepper during pregnancy. The reason given by the majority of them was craving reported by 33.3% from the experimental and 67.6% from the control group.

34.0% of the respondents in both groups preferred eating sour milk and the reason given by 91.2% of them from the control and 80.0% from the experimental was craving. Another reason reported by 33.3% from the experimental and 25.0% from the control was liking. Pepsi-cola was preferred by 31.7% of the
control and 16.6% of the experimental group. 1.00% of the experimental and 52.1% from the control mentioned they liked pepsi-cola. Also 25.0% of from experimental and 52.6% from the control reported that pepsi-cola was nutritious. While, 75.0% from the experimental and 47.0% from the experimental reported craving as one of the reasons for preferring pepsi-cola.

36.7% respondents from the two groups reported that they preferred eating watermelon during pregnancy. The reasons given by them were liking and craving as reported by 90.0% from the experimental and 58.3% from the control.

31.4% of the respondents in both groups preferred eating cucumber during pregnancy. The majority 100% of them from the experimental and 70.0% from the control mentioned craving as the main reason, while 50% of them in both groups said they liked cucumber.

Table 7 shows the extent of food avoidance and reasons for that as reported by respondents from the two groups. Responses of avoidance were classified into three groups: health (ABH) such as causing vomiting, nausea diarrhoea or allergy's taboos (ABT) such as
Table 7:
Reasons and extent of avoidance of food reported by the two groups

<table>
<thead>
<tr>
<th>Food</th>
<th>Extent of Avoidance %</th>
<th>Reasons of Avoidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kisra (National Bread)</td>
<td>100.0</td>
<td>ABH a</td>
</tr>
<tr>
<td>Camel’s Liver</td>
<td>100.0</td>
<td>ABT b</td>
</tr>
<tr>
<td>Tea</td>
<td>100.0</td>
<td>ABT b</td>
</tr>
<tr>
<td>Coffee</td>
<td>100.0</td>
<td>ABH a</td>
</tr>
<tr>
<td>Fatty meat</td>
<td>100.0</td>
<td>ABH a</td>
</tr>
<tr>
<td>Watermelon seeds</td>
<td>100.0</td>
<td>ABH - Abortion</td>
</tr>
<tr>
<td>Rice</td>
<td>90.0</td>
<td>ABF</td>
</tr>
<tr>
<td>Fermented Sorghum foods</td>
<td>90.0</td>
<td>ABH - Abortion</td>
</tr>
<tr>
<td>Milk</td>
<td>90.0</td>
<td>ABH a</td>
</tr>
<tr>
<td>Fresh fish</td>
<td>80.0</td>
<td>ABH a</td>
</tr>
<tr>
<td>Eggs</td>
<td>70.0</td>
<td>ABH</td>
</tr>
<tr>
<td>Malted sorghum foods</td>
<td>70.0</td>
<td>ABH a</td>
</tr>
<tr>
<td>Sesame seeds</td>
<td>70.0</td>
<td>ABF</td>
</tr>
</tbody>
</table>

KEY:
- ABH a: Avoidance based on health.
- ABT b: Avoidance based on tradition.
- ABF: Avoidance based on false belief.
causing abortion; faulse (ABF) preceptions such as fattoning or causing the baby to growth too big or baby to move too quickly.

Foods mostly liked and eaten during pregnancy included Lemon juice with a large amount of sugar, tomatoes, cheese biscuit. Pepsi-cola and water with sugar were widely drunk and believed to treat morning sickness and nausea.

Dried meat stew and sour milk stew were the best liked dishes eaten with sorghum porridge - mentioned by more than 70% of the participants.

Lemon juice was strongly believed to help in strengthening blood and combating anaemia, mentioned by 80% of the participants.

Table 8 shows the number of meals, the respondents used to eat before and during pregnancy. Before pregnancy 38.3% of the experimental and 66.7% of the control group used to eat 3 meals per day, while 31.7% of the experimental and 25.0% of the control group used to eat 2 meals. 10% of the experimental and 5.0% of the control used to eat 4 meals per day. Only 3.3% of the control group used to have one meal per day.
During pregnancy, 45.0% of the experimental group and 46.7% of the control group used to eat 2 meals per day. 40.0% of the control and 10.0% of the experimental group used to eat 3 meals, while 13.3% and 4.3% of the experimental and control group respectively used to eat four meals per day. 11.7% of the experimental and 5.0% of the control group used to eat 1 meal per day.

Table 8:

<table>
<thead>
<tr>
<th>No. of Meal per day</th>
<th>Experimental Respondents</th>
<th>Control Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Before Pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
<td>31.7</td>
</tr>
<tr>
<td>3</td>
<td>35</td>
<td>58.3</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>10.0</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
</tr>
<tr>
<td>During Pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td>11.7</td>
</tr>
<tr>
<td>2</td>
<td>27</td>
<td>45.0</td>
</tr>
<tr>
<td>3</td>
<td>18</td>
<td>30.0</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>13.3</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 9:
Distribution of Respondents by appraisal of their food intake for the last 24 hours

<table>
<thead>
<tr>
<th>Food Groups</th>
<th>Experimental No.</th>
<th>Experimental %</th>
<th>Control No.</th>
<th>Control %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk group appraisal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>25</td>
<td>41.7</td>
<td>19</td>
<td>31.7</td>
</tr>
<tr>
<td>Fair</td>
<td>30</td>
<td>50.0</td>
<td>28</td>
<td>46.7</td>
</tr>
<tr>
<td>Good</td>
<td>5</td>
<td>8.3</td>
<td>11</td>
<td>21.6</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td>60</td>
<td>100.0</td>
</tr>
<tr>
<td>Meat group appraisal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>16</td>
<td>26.7</td>
<td>20</td>
<td>33.3</td>
</tr>
<tr>
<td>Fair</td>
<td>28</td>
<td>46.6</td>
<td>23</td>
<td>41.7</td>
</tr>
<tr>
<td>Good</td>
<td>16</td>
<td>26.7</td>
<td>15</td>
<td>25.0</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td>60</td>
<td>100.0</td>
</tr>
<tr>
<td>Energy food appraisal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>2</td>
<td>33.3</td>
<td>24</td>
<td>6.7</td>
</tr>
<tr>
<td>Fair</td>
<td>23</td>
<td>38.3</td>
<td>22</td>
<td>36.3</td>
</tr>
<tr>
<td>Good</td>
<td>15</td>
<td>38.3</td>
<td>14</td>
<td>56.7</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td>60</td>
<td>100.0</td>
</tr>
<tr>
<td>Vegetable and fruit group appraisal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>40</td>
<td>66.7</td>
<td>42</td>
<td>70.0</td>
</tr>
<tr>
<td>Fair</td>
<td>18</td>
<td>30.0</td>
<td>16</td>
<td>24.7</td>
</tr>
<tr>
<td>Good</td>
<td>2</td>
<td>3.3</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td>60</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Regarding respondents' evaluation of the amount of food they used to eat, whether they thought it was enough, more or less than their needs, 61.3% of the experimental and 46.7% of the control group stated it was enough, while 23.3% of the control and 16.7% of the experimental group thought it was less. 28.3% of the control and 16.7% of the experimental group stated that they were not certain. A minimum number of respondents - 5.0% and 1.7% of the experimental and control group respectively - stated that the amount of food they used to eat was more than they thought they needed.

Table 9 illustrates the distribution of respondents by appraisal of their food intake, depending on the number of different food groups each one had eaten during the period of the 24 hour recall. The best appraisal was obtained for the energy rich foods group where for 58.3% of the experimental and 56.7% of the control group their appraisal was good. For 38.3% and 36.3% of the experimental and control group respectively their appraisal was fair while for 3.3% of the experimental and 6.7% of the control group their appraisal was poor.

Milk food group appraisal was as follows: 41.7% and 31.3% of the experimental and control groups
respectively their intake was poor. For 59.0% of the experimental and 46.7% of the control group their intake was fair while for only 8.3% of the experimental and 21.6% of the control their appraisal was good.

Meat food group appraisal was found to be as follows: 46.6% of the experimental and 41.7% of the control group obtained fair appraisal. For 35.3% of the control and 26.7% of the experimental group their intake appraisal was poor. For 26.7% of the experimental and 25.0% of the control group their appraisal was good.

Food intake appraisal for vegetables and fruits group was as fellow: 70.0% of the control and 66.7% of the experimental group was poor. For 10.0% of the experimental and 26.7% of the control group their food intake appraisal was fair and for only 3.3% in each of the two groups their intake appraisal was good.

Table 10 illustrates the number of servings consumed per day by the respondents compared with the recommended daily allowance of serving. The average number of meat servings consumed by the experimental group was 2 per day and that consumed by the control was 1.5 while the recommended allowance was 3 servings per day.
Table 10:

Number of Servings per day Compared with Recommended Allowance

<table>
<thead>
<tr>
<th>Meat (1)</th>
<th>Milk (2)</th>
<th>Energy rich (3)</th>
<th>Fruit and Vegetable (4)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommend</td>
<td>3 + 4 +</td>
<td>5</td>
<td>2 + 2</td>
<td>12</td>
</tr>
<tr>
<td>Exp. group</td>
<td>2.0</td>
<td>0.7</td>
<td>6.0</td>
<td>0</td>
</tr>
<tr>
<td>Control group</td>
<td>1.5</td>
<td>0.9</td>
<td>6.0</td>
<td>0</td>
</tr>
</tbody>
</table>


(1) One serving is 2 ounces of cooked meat, fish or poultry without bone or one chicken leg. Substitutes: 0.5 cup of cheese, 1 cup cooked peas, beans or lentils or 2 eggs or 4 tbsp peanut butter.

(2) One serving of milk is 0.25 pint.

(3) One serving of energy-rich food is one slice bread (40 gms) or medium potato (60 gms) or 1.5 cup cooked white grain cereal such as rice, macaroni or wheat.

(4) One serving of fruit is 1 medium banana, 1 medium orange or 0.5 grapefruit.

(5) One serving of vegetables is 0.5 to 0.75 cup.
Number of servings of milk was very low for the two groups; it was less than one serving; 0.7 and 0.9 for the experimental and control group respectively. The recommended allowance for milk was 4 servings.

Number of servings for energy-rich foods for the two groups was 6 more than the recommended number which is 5 servings.

Number of servings for fruit was 0 for the two groups. While the recommended allowance is 2 servings.

Number of servings for vegetable was 1 and 1.5 for the experimental and control groups respectively while the recommended allowance was 2 or more.

Regarding the respondents' beliefs concerning the best food items to be eaten during pregnancy, 80% of the two groups - experimental and control - stated that meat is the best. Lemon juice, milk, fruits, vegetables, bread, eggs, beans and fish were reported in the order of their importance by 72.0%, 58.0%, 67.0%, 40%, 40.0%, 10.0%, 25.0% and 15.0% of the two groups respectively.
Regarding habits of eating strange things like mud and chalk during pregnancy, 89.0% of the two groups stated that they had heard of such habits. 36.7% of the experimental and 41.7% of the control group stated that they ate clay and chalk.

With regard to harmful habits such as cigarette smoking, all respondents did not smoke except one respondent who stated that she used to smoke before pregnancy but during pregnancy had given it up.

Table 11 a:

<table>
<thead>
<tr>
<th>Source of Information</th>
<th>Experimental N, 60</th>
<th>Control N, 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers or mothers-in-law</td>
<td>15 71.4</td>
<td>17 60.7</td>
</tr>
<tr>
<td>Doctors</td>
<td>5 28.8</td>
<td>4 14.2</td>
</tr>
<tr>
<td>Midwives</td>
<td>18 85.7</td>
<td>11 75.0</td>
</tr>
<tr>
<td>Radio</td>
<td>2 9.5</td>
<td>5 18.3</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Information</td>
<td>21 35</td>
<td>23 48.7</td>
</tr>
</tbody>
</table>

Table 11 a shows sources from which respondents had received nutrition information. 71.4% of the respondents of the experimental received information
from their mothers or their husband's mothers. 23.8% of them received information from a doctor while 85.7% stated they received information from midwives and only 9.5% stated radio as a source from which they got information. 60.7% of the respondents from the control group stated that they got information from their mothers and their husband's mothers. 14.1% of the control received information from doctor while 75.0% of them received information from midwives and 10.5% of them received information from radio.

It is important to mention that most of the respondents stated that they received information from more than one source. Also it is worth noting that out of the 60 respondents of the experimental only 21 (35%) stated that they received nutrition information, the remaining 65% gave a negative response to this item. Out of the 60 respondents of the control group 28 (46.7%) stated that they received nutrition information while the remaining 53.3% stated that nobody had informed them about nutrition.

Table 11 b illustrates types of nutrition information the respondents received. The majority 80.1% of the respondents from the experimental group
who received information stated that they received advice such as to eat less fatty meat. 48.0% of them stated they had been advised to work hard particularly in third trimester - it was believed that hard work made labour easier. 38.1%, 33.3%, 23.8% and 19.0% of this group stated that they received advice such as to take rest, eat more, drink milk and hold a special ceremony (Rubat) respectively.

Table 11 b:

<table>
<thead>
<tr>
<th>Type of Information Given</th>
<th>Experimental</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>House rest</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Eat more</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Eat less fatty meat</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>Drink milk</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Work hard - particularly during the third trimester</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Special ceremony (Rubat)</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Types of advice and information recieved by the respondents from the control group were, to eat less fatty meat, eat more, work hard particularly during the last trimester, hold a special ceremony (Rubat) drink milk and have rest, reported by 46.4%, 25.0%, 21.2%, 14.4%, 7.2% and 3.6% of the respondents respectively.
"Rubat" literally means the tie. This tie ceremony is a custom carried out during pregnancy. A wife usually performs this rite in the seventh month of her first pregnancy. Some of the relatives and neighbours attend the rite and the lunch party that follows it. Food is offered consisting of porridge and "Halah Hoob" made from your milk and mutton.

Table 12 illustrates authority figures responsible for selection, preparation and distribution of food. 70% of the respondents from the control and 65% from the experimental group stated that their husbands were responsible for selecting the food. 31.7% of the experimental and 16.7% of the control stated that their mothers were responsible for selecting the food. 5% of the control group and 1.1% of the experimental stated that they themselves were responsible for selecting the food. 5% of the control stated that food selection was done by others such as an older sister.

31.7% of the control and 25.0% of the experimental stated that food preparation was done by their mothers. 58.3% of the experimental and 35% of the control group
Table (12):-

**Authority Figures Responsible for Selection, Preparation and Distribution of Food**

<table>
<thead>
<tr>
<th>Authority</th>
<th>Selection</th>
<th>Preparation</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expt. %</td>
<td>Cont. %</td>
<td>Expt. %</td>
</tr>
<tr>
<td>Husband</td>
<td>39</td>
<td>65</td>
<td>42</td>
</tr>
<tr>
<td>Mothers</td>
<td>19</td>
<td>31.7</td>
<td>10</td>
</tr>
<tr>
<td>Respondent-</td>
<td>3</td>
<td>3.3</td>
<td>3</td>
</tr>
<tr>
<td>herself</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>-</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
stated that they themselves were responsible for food preparation. 33.3% of the control and 16.7% of the experimental stated that food preparation was carried out by others.

35% of the experimental and 30% of the control group, stated that their mothers were responsible for food distribution. 42% of the experimental and 36.7% of the control stated that they themselves were responsible for the distribution of food. 33.3% and 20% of the control and experimental stated that, food distribution was carried out by others such as sisters.

Table 13 shows the order of food serving among family members. Men usually were served first as reported by 86.7% of respondents from the experimental group and 83.3% from the two groups, while only 8.3% of respondents in both groups reported that children were served first, 5.0% of respondents from experimental and 8.3% of respondents from the control group stated that the whole family would eat together.
Table 13:

<table>
<thead>
<tr>
<th>Respondents From</th>
<th>Experimental</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Husband</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Men-guests</td>
<td>52</td>
<td>86.7</td>
</tr>
<tr>
<td>Women-guest</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Respondents</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Children</td>
<td>5</td>
<td>8.3</td>
</tr>
<tr>
<td>Women and children</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>The whole family together</td>
<td>3</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Table 14:

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Respondents</th>
<th>Experimental</th>
<th>%</th>
<th>Control</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>12</td>
<td>20.0</td>
<td></td>
<td>16</td>
<td>26.7</td>
</tr>
<tr>
<td>Elementary</td>
<td>16</td>
<td>26.7</td>
<td></td>
<td>14</td>
<td>23.3</td>
</tr>
<tr>
<td>General Secondary</td>
<td>10</td>
<td>16.7</td>
<td></td>
<td>17</td>
<td>28.3</td>
</tr>
<tr>
<td>High Secondary</td>
<td>17</td>
<td>28.3</td>
<td></td>
<td>11</td>
<td>18.3</td>
</tr>
<tr>
<td>Above Secondary</td>
<td>5</td>
<td>8.3</td>
<td></td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td>60</td>
<td>100.0</td>
</tr>
</tbody>
</table>
of the experimental group had completed the general secondary level while 28.3% of the experimental and 18.1% of the control group had completed the high secondary level. Only 8.3% of the experimental and 3.3% of the control group had an educational level above high secondary i.e. university or higher institutions.

Table 15:

<table>
<thead>
<tr>
<th>Type of Occupation</th>
<th>Respondents</th>
<th>Experimental</th>
<th>%</th>
<th>Control</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housewives</td>
<td></td>
<td>27</td>
<td>78.3</td>
<td>41</td>
<td>66.3</td>
</tr>
<tr>
<td>Professionals</td>
<td></td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Elementary School Teacher and Clerks</td>
<td></td>
<td>9</td>
<td>13.0</td>
<td>12</td>
<td>20.0</td>
</tr>
<tr>
<td>Partially Skilled Labourer (2)</td>
<td></td>
<td>3.3</td>
<td></td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Unskilled Labourers (3)</td>
<td></td>
<td>2</td>
<td>3.3</td>
<td>3</td>
<td>5.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>60</td>
<td>99.9</td>
<td>60</td>
<td>99.9</td>
</tr>
</tbody>
</table>

(1) Professionals e.g. physicians and high school teachers.
(2) Partially skilled - dressmakers.
(3) Unskilled labourer - home servants.
school teacher. 15.0% of the experimental and 20% of the control group were elementary school teachers and clerks. 3.3% of each of two groups were partially skilled labourers—dressmakers.

3.3% of the experimental and 5.0% of the control group were unskilled labourers—home servants.

Table 16:

<table>
<thead>
<tr>
<th>Family Income in Sudanese pounds</th>
<th>Respondents Experimental No.</th>
<th>%</th>
<th>Control No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 - 500</td>
<td>35</td>
<td>58.3</td>
<td>28</td>
<td>46.7</td>
</tr>
<tr>
<td>600 - 900</td>
<td>6</td>
<td>10.0</td>
<td>7</td>
<td>11.7</td>
</tr>
<tr>
<td>1000 - 1300</td>
<td>9</td>
<td>15.0</td>
<td>13</td>
<td>21.6</td>
</tr>
<tr>
<td>1400 - 1700</td>
<td>10</td>
<td>16.7</td>
<td>12</td>
<td>20.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>60</strong></td>
<td><strong>100.0</strong></td>
<td><strong>60</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table 16 shows family income, 58.3% and 46.7% of the experimental and control group respectively had a family income ranging from 200 to 500 Sudanese pounds.
RESULTS OF DATA COLLECTED FROM LACTATING MOTHERS

The following findings present analysis of data collected from sample III. This sample consisted of 120 lactating mothers who were the same mothers studied during pregnancy.

Table 19:

<table>
<thead>
<tr>
<th>Place of Delivery</th>
<th>Respondents</th>
<th>Experimental</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No %</td>
<td>No %</td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>17</td>
<td>28.3</td>
<td>11</td>
</tr>
<tr>
<td>Public hospitals</td>
<td>33</td>
<td>55.0</td>
<td>30</td>
</tr>
<tr>
<td>Private hospitals</td>
<td>10</td>
<td>16.7</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td>60</td>
</tr>
</tbody>
</table>

Table 19 shows places of delivery of respondents from the experimental and control group. 28.3% of the experimental and 18.3% of the control group delivered in their homes. 55.0% and 50.0% of the experimental and control respectively delivered in public hospitals, while 31.7% of the control and 16.6% of the experimental delivered in private hospitals.
Table 20:
Distribution of Respondents by Birth Weight

<table>
<thead>
<tr>
<th>Birth Weight/ Kg</th>
<th>Experimental No</th>
<th>Control No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Respondents</td>
<td></td>
</tr>
<tr>
<td>1.75 - 2.25</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>2.25 - 2.75</td>
<td>17</td>
<td>30</td>
</tr>
<tr>
<td>2.75 - 3.25</td>
<td>32</td>
<td>20</td>
</tr>
<tr>
<td>3.25 - 3.75</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>3.75 - 4.00</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

Table 20 shows distribution of respondents by birth weight of their babies. 3.3% of the respondents from the control group had babies with weights ranging from 1.75 to 2.25 Kg. 50.0% of the control and 28.3% of the experimental group had babies with birth weight in the range of 2.25 to 2.75 Kg. For 53.3% of the experimental and 33.3% of the control group, the birth weight of their babies was in the range of 2.75 to 3.25 Kg. While for 15.0% of the experimental and 13.3% of the control group had babies with a birth weights in the range of 3.25 to 3.75 Kg, and only 3.3%
of the experimental their babies had birth weight in the range of 3.75 to 4.00 Kg.

T-test for each of the two group's results was calculated as follows:

Experimental  $t = 2.9109$
Control  $t = 1.1948$

From the $t$-distribution table for 4 i.e. $(5 - 1)$ degree of freedom testing at 0.05 level of significance we get: $t = 2.132$.

As experimental $t > 2.132$, it could be concluded that the results obtained showed that babies of the experimental were heavier than babies of the control group.

Responses regarding method of infant feeding, 95.0% and 91.7% of the control and the experimental had initiated breast feeding their babies in the first week after delivery. One month later 83.3% and 66.7% of the experimental and the control respectively stated that they combined breast feeding and artificial feeding. The majority of the experimental (68.3%) and (60.0%) of the control stated that they were worried that their milk might not be enough to satisfy the baby's needs. Other reasons given by those who had not initiated
Regarding reasons determining duration of breastfeeding responses were as follows: 95.0% of the respondents from each group stated that the Koran had asked women to feed their babies for 2 years.

50.0% of the experimental and 45.0% of the control from those who intended to breast feed their babies up to one year, said that by the age of one year the baby is old enough to eat the family's diet. 55.0% from each group stated that milk secretion will diminish by the age of one year. Some respondents gave more than one reason for example 20.0% of the control and 15.0% of the experimental group stated that they would like to get pregnant when their babies reach the age of one year.

Regarding relating to advice received on breastfeeding, 75.0% of the experimental and 66.7% of the control stated that they had received advice from different sources.

Table 21 shows these sources of advice. 71.4% of the control and 95.5% of the experimental group received advice from nurses while 75.0% of the control and 62.3% of the experimental group received advice from their mothers.
35.7% of the control and 33.3% of the experimental received advices from other, e.g. husbands and radio.

Table 21:

Distribution of Respondents by Source of Advice on Breast Feeding

<table>
<thead>
<tr>
<th>Source of Advice</th>
<th>Respondents Experimental</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Midwives</td>
<td>25</td>
<td>55.5</td>
</tr>
<tr>
<td>Nurse</td>
<td>15</td>
<td>33.3</td>
</tr>
<tr>
<td>Mothers</td>
<td>28</td>
<td>62.3</td>
</tr>
<tr>
<td>Others (including husbands - radio)</td>
<td>15</td>
<td>33.3</td>
</tr>
</tbody>
</table>

Responses to the time when supplementary food was introduced were as follows: 70.0% from each group of the respondents stated that they started from the first two months introducing food to their babies. 16.7% of the experimental and 10.0% of the control introduced supplementary food at the age of three months, while 20.0% of the control and 13.3% of the experimental introduced supplementary food after the fourth months. First foods introduced were bananas, biscuits, baby formula and lemon juice which was the first supplement to be introduced in the first week of life.
Responses regarding methods of weaning of previous children were as follows: 78.1% of the experimental and 60.0% of the control stated that they had weaned their previous children suddenly. The remaining 40.0% of the control and 21.7% of the experimental stated that they weaned their children gradually.

Responses to whether respondents had heard of family planning or not were as follows: 80.0% from each group stated that they had heard of family planning and 60.0% of the experimental and 55.0% of the control group stated that they were practising one of the contraceptive methods.

Regarding responses relating to the number of children each respondent would like to have, 55.0% of the experimental and 41.7% of the control stated they would like to have 4 children, 30.0% of the control and 23.3% of the experimental stated 6 children. 28.3% of the control and 23.3% of the experimental stated 3 children.

Responses referring to immunization during pregnancy and infancy were as follows 90.0% of the experimental and 83.3% of the control group stated they had been immunized against tetanus, 90.0% of the
experimental and 70.0% of the control group stated that they had started immunizing their infants.

Table 22:

Distribution of Respondents by the type of Hot and Cold Drinks taken immediately after delivery

<table>
<thead>
<tr>
<th>Type of Hot and Cold Drinks</th>
<th>Experimental</th>
<th>%</th>
<th>Control</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee</td>
<td>40</td>
<td>66.7</td>
<td>37</td>
<td>61.7</td>
</tr>
<tr>
<td>Milk</td>
<td>10</td>
<td>16.7</td>
<td>12</td>
<td>20.0</td>
</tr>
<tr>
<td>Tea</td>
<td>5</td>
<td>8.3</td>
<td>6</td>
<td>10.0</td>
</tr>
<tr>
<td>Herbs with sugar</td>
<td>2</td>
<td>3.3</td>
<td>5</td>
<td>8.3</td>
</tr>
<tr>
<td>Pepsi-cola</td>
<td>2</td>
<td>3.3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lemon juice</td>
<td>1</td>
<td>1.7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>60</strong></td>
<td><strong>100.0</strong></td>
<td><strong>60</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Regarding food habits during lactation, table 22 illustrates the hot and cold drinks that were immediately taken by respondents after delivery. Coffee was the first drink taken by the majority (66.7%) of the experimental and 61.7% of the control, while milk was taken by 20.0% of the control and 16.7% of the experimental group. 10.0% of the control and 8.3% of the experimental had taken tea immediately after delivery. 8.3% of the control and 3.3% of the experimental had taken herbs with sugar. Pepsi-cola had
been taken by 3.3% of the experimental and 1.7% of the control group had taken lemon juice.

Table 23:

<table>
<thead>
<tr>
<th>Type of Special Foods &amp; Drinks</th>
<th>Experimental No</th>
<th>Experimental %</th>
<th>Control No</th>
<th>Control %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>37</td>
<td>61.7</td>
<td>46</td>
<td>66.7</td>
</tr>
<tr>
<td>Helba seeds</td>
<td>39</td>
<td>65.3</td>
<td>42</td>
<td>70.0</td>
</tr>
<tr>
<td>Meat soup</td>
<td>27</td>
<td>45.0</td>
<td>30</td>
<td>50.0</td>
</tr>
<tr>
<td>Tahinia sweet-halva</td>
<td>41</td>
<td>68.3</td>
<td>25</td>
<td>58.3</td>
</tr>
<tr>
<td>Kisra + sugar</td>
<td>25</td>
<td>41.7</td>
<td>20</td>
<td>33.3</td>
</tr>
<tr>
<td>Fas + sugar</td>
<td>30</td>
<td>50.0</td>
<td>26</td>
<td>43.3</td>
</tr>
<tr>
<td>Lemon juice</td>
<td>45</td>
<td>75.0</td>
<td>40</td>
<td>66.7</td>
</tr>
</tbody>
</table>

* Helba - Fenugreek seed.

Table 23 shows type of special food and drinks taken by respondents during lactation. 66.7% of the control and 61.7% of the experimental stated milk. 70.0% of the control and 65.0% of the experimental group stated helba - fenugreek seed in the form of a beverage or pudding made from flour, milk, sugar and ghee. 50.0% of the control and 45.0% of the experimental stated meat soup. 63.3% of the experimental and 58.3% of the control group used to eat...
Tahinia sweet, 41.7% and 33.3% of the experimental and control group respectively used to take kisra mixed with water and sugar while 50.0% of the experimental and 43.3% of the control used to take sorghum pap with sugar. The majority 75.0% of the experimental and 66.7% of the control used to take lemon juice.

Regarding responses to reasons why these foods and drinks were taken - 90.0% of the respondents from each group stated that they used to take milk, helba-seeds and kisra + sugar to increase milk production: 10.0% of respondents from each group stated that they used to take such food in order to increase their weight. Some respondents from the two group mentioned more than one reason. So 35.0% of the experimental and 30.0% of the control group stated that it is the Sudanese tradition that a lactating mother should eat food such as kisra + sugar, sorghum pap - Helba seed pudding, milk, Tahinia sweets and lemon juice in order to increase their milk production and become fat after confinement.

With regard to responses on number of meals per day after delivery, 90.0% of the experimental and 80.0% of the control group stated that they used to eat 3 meals; 20.0% of the control and 10.0% of the control
group reported that they used to take 4 meals per day after delivery.

Responses regarding whether respondents had avoided any food during lactation, were as follows: the majority 80.0% from each group of respondents stated that they had not avoided any food. The remaining 20.0% stated they had avoided some foods. Foods avoided were onion, seasoning, garlic and fish. Regarding reason of avoidance, all respondents stated that these foods cause an odd odour to milk.

Regarding responses to whether respondents from the two groups had received information about food and nutrition during lactation were as follows: 70.0% of the control and 73.3% of the experimental stated that they had received information. Table 24 illustrates sources of information about food and nutrition during lactation.

Table 24 shows that 90.9% of the experimental and 74.8% of the control group had received nutrition information from their mothers and their husbands' mothers. 84.3% of the control and 69.1% of the
Table 24:
Distribution of Respondents by source of Information on food and nutrition during lactation

<table>
<thead>
<tr>
<th>Source of Information</th>
<th>Experimental No</th>
<th>Experimental %</th>
<th>Control No</th>
<th>Control %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers/ mothers in law</td>
<td>40</td>
<td>90.9</td>
<td>31</td>
<td>74.8</td>
</tr>
<tr>
<td>Doctor</td>
<td>10</td>
<td>69.1</td>
<td>8</td>
<td>84.3</td>
</tr>
<tr>
<td>Midwives</td>
<td>16</td>
<td>55.5</td>
<td>19</td>
<td>45.2</td>
</tr>
<tr>
<td>Radio</td>
<td>8</td>
<td>11.4</td>
<td>5</td>
<td>11.9</td>
</tr>
<tr>
<td>Others</td>
<td>15</td>
<td>34.1</td>
<td>11</td>
<td>26.1</td>
</tr>
</tbody>
</table>

The experimental group had received nutrition information from doctors. 55.5% of the experimental and 45.2% of the control group had received information from midwives. 11.9% and 11.4% of the control and experimental group had heard nutrition information over the radio while 34.1% of the experimental and 26.1% of the control had received information from other sources - husbands, relatives and books.

Table 25 shows food intake appraisal of respondents during the last 24 hours. This was evaluated quantitatively using the appraisal method, of El Tahawi 1975.
Table 25:
Distribution of Respondents by Appraisal of their food intake during the last 24 hours

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Experimental</th>
<th></th>
<th></th>
<th>Control</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>19</td>
<td>31.7</td>
<td>19</td>
<td>31.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>31</td>
<td>51.7</td>
<td>33</td>
<td>55.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>10</td>
<td>16.6</td>
<td>9</td>
<td>13.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>6</td>
<td>10.0</td>
<td>8</td>
<td>13.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>36</td>
<td>60.0</td>
<td>38</td>
<td>63.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>18</td>
<td>30.0</td>
<td>14</td>
<td>23.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy rich food</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td></td>
<td></td>
<td>2</td>
<td>3.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>39</td>
<td>65.0</td>
<td>45</td>
<td>74.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>21</td>
<td>35.0</td>
<td>13</td>
<td>21.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetable and fruit group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>38</td>
<td>63.3</td>
<td>40</td>
<td>66.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>13</td>
<td>21.7</td>
<td>18</td>
<td>30.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>9</td>
<td>15.0</td>
<td>2</td>
<td>3.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
With regard to the milk and milk products food, the intake of 31.7% of the respondents from each of the two groups was poor. For 55.0% of the control group and 51.7% of the experimental group their intake of milk group was fair; while only 16.7% of the experimental and 13.3% of the control had a good intake of the milk group.

The intake grades for the meat group were as follows: 13.3% of the control and 10.0% of the experimental group had a poor intake. 63.3% of the control and 60.0% of the experimental had a fair intake while 30.0% of the experimental and 23.3% of the control had a good intake.

Concerning the energy rich food intake, only 3.3% of the control group had a poor intake for the last 24 hours. 75.0% of the control and 65.0% of the experimental had a fair intake while for 35.0% of the experimental and 21.7% of the control their intake was good.

With regard to the intake of the vegetables and fruit group, for 66.7% of the control and 61.7% of the experimental their intake was poor; for 30.0% of the control and 21.7% of the experimental their intake was fair and only 15.0% of the experimental and 1.1% of the control had a good intake.
NUTRITIONAL STATUS OF THE INFANTS

Figure 3:

Illustrates birth weight and weight gains to the age of six months, for infants from the two groups. The results were compared with the local standard as reported by the National Formulary (1979).

The main birth weight in the local standard was 3.4 Kgm for boys and girls. The mean birth weight of the infants under study was 3.1 Kgm for infants of the experimental and 3.0 Kgm for infants of the control group.

As shown from the figure for infants of the two groups the main weight gain in every month of age was less than the local standard.

Figure 4:

Shows birth height and height gain to the age of six months, for infants from the two groups. The results were compared with the local standard reported by the National Sudan Formulary (1979). Birth height was 50 cm, the same as the local standard.

Mean height at age up to 5 months was found in the range of 58.0 cm to 64 which was less than the standard.
Figure 3

Mean Weight Gain of Infants in First Six Months

Age in Months

○ — S  local standard
○ — E  Infants from experimental group
○ — C  Infants from control group
Figure 4:

Height gain = Age of infant

- Local Standard
- Infants from the experimental group
- Infant from the control group

Age in months
At age of 6 months the mean height for the infants of the experimental group was 66.4, more than the local standard which was 66.0 cm, while mean height of infant from the control group was the same as the local standard.

Figure 6:

Illustrates respondents' birth weight distribution as well as weight gain for all infants for the first 6 months of life. For the first two months both the breast fed and mixed fed had a weight gain which was almost scattered and the same positions around the local standard.

At age of 3 up to 6 months those who were breast fed showed an almost steady growth rate while those who were mixed fed showed a fluctuating rate of growth, that was both above the local standard and below it.
Figure 5:

WDLNE = For Age of Infants

N = 119

Age in Months

• Exclusively Breast fed
• Mixed fed
• Local standard
RESULTS OF NUTRITION - PRE AND POST TESTS

As mentioned in the chapter on methodology, nutrition pre- and post-tests were administered to all respondents in sample I and sample II. Results of these tests were presented in percentages in the following tables 26-48.

Table 26 illustrates responses to question I of the pre and post tests asking respondents to define the word "nutrition" (see term definition in chapter I).

Results of the pre test was as follows:-

11.7% of the experimental group answered correctly.
63.3% of the experimental group had tried to answer but failed.
25.0% of the experimental group had not tried to answer.
8.3% of the control group answered correctly.
61.7% of the control group had tried to answer but failed.
30.0% of the control group had not tried to answer.

Results of the post test was as follows:-

65.0% of the experimental gave the correct answer.
38.3% of the experimental tried but failed.
6.7% of the experimental had not tried.
68.3% of the control had tried to answer.
18.3% of the control managed to answer correctly.
13.3% of the control had not tried.

The following table 27 illustrates responses to question "2" of the pre and post tests, asking respondents to tick against 5 food items rich in protein from a given list.

Results of the pre test were presented as follows:

58.1% of the experimental group ticked against meat
8.3% of the experimental group ticked against lentils.
5.0% of the experimental group ticked against chicken.
3.3% of the experimental group ticked against eggs.
55.3% of the control group ticked against meat.
8.3% of the control group ticked against chicken, lentil and broad beans.

Results of the post test showed the following:

75% of the experimental group ticked against meat and peanuts.
70% of the experimental group ticked against lentils.
68.6% of the experimental group ticked against chicken and fish.
68.3% of the experimental group ticked against broad beans.
55% of the control group ticked against meat.
8.3% of the control group ticked against lentils.
3.3% of the control group ticked against broad beans.

Table 28 shows responses to question 4 of the pre and post test which asked the respondents to tick against 5 food items rich in calcium from a given list.

Results of the pre test showed the following:

33.3% of the experimental group ticked against milk and rice.
12.6% of the experimental group ticked against eggs.
8.3% of the experimental group ticked against cheese.
3.3% of the experimental group ticked against fish.
35% of the control group ticked against milk.
12% of the control group ticked against pulses.
16.7% of the control group ticked against cheese.
8.3% of the control group ticked against eggs and fish.

Results of the post test were as follows:

- 75% of the experimental group ticked against milk
- 70% of the experimental group ticked against eggs and cheese.
- 53.1% of the experimental group ticked against pulses.
- 46.7% of the experimental group ticked against watermelon and dried okra.
- 33.1% of the control group ticked against milk, pulses and fish only.

Table 29 shows responses to question 5 of the pre- and post-tests which asked the respondents to select the 6 main nutrients out of a given list.

Results of the pre test showed the following:

- 55% of the experimental group selected fats.
- 35% of the experimental group selected proteins and vitamins.
- 8.3% of the experimental group selected carbohydrates.
58.3% of the control group selected fats and vitamins.
30% of the control group selected protein.
8.3% of the control group selected iron and carbohydrates.

Results of the post test were as follows:

90% of the experimental group selected iron.
80% of the experimental group selected protein.
70% of the experimental group selected vitamins, fats and carbohydrates.
33% of the experimental group selected water.
41.7% of the control group selected vitamins.
33.3% of the control group selected protein.
8.1% of the control group selected iron.
3.3% of the control group selected carbohydrates.

Table 30 illustrates question 6 of the pre- and post-tests which asked respondents to mention 3 nutrients found in (Sharmouta stew).

Results of the pre-test were as follows:

50% of both groups - experimental and control-mentioned protein and fats.
16.7% of the experimental mentioned protein.
33.3% of the experimental mentioned vitamins.
20% of the control mentioned protein
30% of the control mentioned vitamins.

Results of the post-test showed the following:

61.7% of the experimental mentioned iron, protein and fat.
38.3% of the experimental mentioned fat, protein and calcium.
60% of the control mentioned fat, protein and vitamins.
40% of the control mentioned protein only.

Table 31 shows responses to question (7 A) of the pre and post tests, which asked respondents to tick against true answers out of a given list of false and true answers.

Results of the pre test concerning the statement: "Lemon juice is very nutritious and important for infant and children" were shown below.

90.0% of the experimental group ticked against true.
10.0% of the experimental group group ticked against false.
83.3% of the control group ticked against true.
16.7% of the control group ticked against false.

Results of the post test relating to the statement "Lemon juice is very nutritious and important for infants and children" were as fellows:

43.3% of the experimental group ticked against true
40.0% of the experimental group ticked against false.
16.7% of the experimental group gave no answer.
80% of the control group ticked against true.
20% of the control group ticked against false.

Table 2 shows question 76 of the pre- and post tests.

Results of the pre-test regarding the statement "Watercress is very rich in minerals especially calcium" were as follows:

16.7% of the experimental group ticked against true
83.3% of the experimental group ticked against false.
96.7% of the control group ticked against false.
3.3% of the control group ticked against true.
Table 34 show results of the pre test about statement emphasizing bottle feeding are as follows:

60.0% of the experimental group ticked against true
33.3% of the experimental group ticked against false.
6.7% of the experimental group gave no answer.
58.3% of the control group ticked against true.
41.7% of the control group ticked against false.

Results of the post test with regard to statement about bottle feeding.

83.3% of the experimental group ticked against false.
16.7% of the experimental group ticked against true.
56.7% of the control group ticked against true.
43.3% of the control group ticked against false.

Table 15 illustrates response to question No. 8: of the pre- and post-tests asking respondents to state two main sources of vitamins. The results obtained for the pre test was as fellows:

80.0% of respondents from each of the two groups - experimental and control mentioned milk, meat, eggs and liver.
16.7% of the experimental mentioned fruits.
3.3% of the experimental mentioned bread, macaroni and rice.
8.3% of the control group mentioned fruit.

Results of the post test revealed the following:

60% of the experimental group mentioned two main sources of vitamins.
33.3% of the experimental group mentioned one source.
16.7% mentioned milk and sorghum.
70% of the control group mentioned meat, fish, eggs and vegetable.
30% mentioned fruit, jam and biscuits.

Table 16 illustrates response to question No. 9 of the pre- and post-test where respondents were asked to mention food and drinks that are important for blood formation.

Results of the pre test showed the following:

66.7% of the experimental group mentioned meat.
65% of the experimental group mentioned lemon juice.
58.3% of the experimental group mentioned milk.
33.3% of the experimental group mentioned raisins.
30% of the experimental group mentioned chicken and green vegetables.
25% of the experimental group mentioned liver and eggs.
10% of the experimental group mentioned fresh fruit.
65% of the control group mentioned lemon juice and meat.
55% of the control group mentioned milk and liver.
33.3% of the control group mentioned chicken, fresh fruit and dates.
28% of the control group mentioned raisins and eggs.
10% of the control group mentioned green vegetables.

Results of the post test revealed the following:

70% of the experimental group mentioned meat.
60% of the experimental group mentioned milk and green vegetables.
55% of the experimental group mentioned liver.
45% of the experimental group mentioned eggs, fresh fruit and dates.
41.7% of the experimental group mentioned raisins.
10% of the experimental group mentioned chicken and lemon juice.
66.7% of the control group mentioned liver.
58.3% of the control group mentioned lemon juice.
55% of the control group mentioned meat and milk.
33.3% of the control group mentioned raisins, chicken, fresh fruits and dates.
20% of the control group mentioned eggs.
3.3% of the control group mentioned green vegetables.

Table 37 illustrates responses to question No. 10 of the pre- and post-tests - respondents were asked to formulate a balanced meal from the square diagram (shown in appendix I and II).

Results of the pre-test was as follows:
31.7% of the experimental group tried but failed.
28.3% of the experimental group did not try.
20.0% of the experimental group succeeded in formulating a balanced meal.
73.3% of the control group tried but failed.
21.7% of the control group succeeded in formulating a balanced meal.
5.0% of the control group did not try.

Results of the post test were as follows:

46.6% of the experimental group tried but failed.
36.7% of the experimental group succeeded in formulating a balanced meal.
16.7% of the experimental group did not try.
54.7% of the control group tried but failed.
33.3% of the control group succeeded in formulating a balanced meal.
10.0% of the control group did not try.

Table 38 shows responses to question No. II of the pre- and post-tests, where the respondents were given the following statement:

"A pregnant woman should eat 3 or 4 meals per day" and were asked to tick against one of the following expression:

- agree
- disagree
- not sure

Results of the pre test were as follows:

46.7% of the experimental group stated they disagreed.
33.3% of the experimental group stated they were not sure.
10.0% of the experimental group stated that they agreed.
43.3% of the control group stated they disagreed.
41.7% of the control group stated that they were not sure.
15.0% of the control group stated they agreed.

Results of the post-test was as follows:

66.7% of the experimental group stated that they agreed.
25.0% of the experimental group stated they were not sure.
8.3% of the experimental group stated they disagreed.
55.0% of the control group stated they were not sure.
26.7% of the control group stated they disagreed.
18.3% of the control group stated that they agreed.

Table 39 illustrates responses to question No. 12 of the pre and post-tests, where the respondents were asked to state whether they agreed, disagreed or were
not sure about the following statement: "Increase of weight after the fifth month of pregnancy at the rate of one kilogram is desirable".

Results of the pre test were as follows:

35.0% of the experimental group stated they disagreed.
33.1% of the experimental group stated they were not sure.
31.7% of the experimental group stated they agreed.
58.3% of the control group stated they disagreed.
35.0% of the control group stated they agreed
26.7% of the control group stated they were not sure.

Results of the post test were as follows:

76.7% of the experimental group stated they agreed.
16.7% of the experimental group stated they were not sure.
6.6% of the experimental group stated they disagreed.
56.7% of the control group stated they disagreed.
25.0% of the control group stated they were not sure.
18.3% of the control group stated they agreed.

Table 40 illustrates responses to question No. 13 of the pre and post tests. The respondents were asked to state whether they agreed, disagreed or were not sure of the following statement:

"Eating strange things like mud and chalk during pregnancy is beneficial to the mother and the foetus".

Results of the pre test were as follows:-

66.7% of the experimental group stated they agreed.

26.7% of the experimental group stated they disagreed.

6.7% of the experimental group stated they were not sure.

50.0% of the control group stated they agreed.

38.3% of the control group stated they were not sure.

11.7% of the control group stated they disagreed.

Results of the post test were as follows:-

81.7% of the experimental group stated they disagreed.

10.0% of the experimental group stated they were not sure.
8.3% of the experimental group stated they agreed.
57.7% of the control group stated they were not sure.
37.7% of the control group stated they agreed.
6.6% of the control group stated they disagreed.

Table 41 shows responses to question No. 14 of the pre- and post-tests. Respondents were asked to state whether they agreed, disagreed, or were not sure of the following statement:

"Planning a balanced meal based on the four food groups is essential".

Results of the pre-test were as follows:

35.0% of the experimental group stated they disagreed.
33.3% of the experimental group stated they agreed.
31.7% of the experimental group stated they were not sure.
43.3% of the control group stated they disagreed.
40.0% of the control group stated they agreed.
16.7% of the control group stated they were not sure.
Results of the post test were as follows:

76.6% of the experimental group stated they agreed.
11.7% of the experimental group stated they disagreed.
11.7% of the experimental group stated they were not sure.
46.7% of the control group stated they agreed.
28.3% of the control group stated they were not sure.
25.0% of the control group stated they disagreed.

Table 42 illustrates responses to question No. 15 of the pre- and post-test. Respondents were asked to state their opinion, whether they agreed, disagreed or not sure of the following statement:

"Poultry raising in the home is cheaper than buying eggs."

Results of the pre test were as follows:

66.7% of the experimental group stated they disagreed.
30.0% of the experimental group stated they were not sure.
3.3% of the experimental group stated they agreed.
50.0% of the control group stated they disagreed.
33.3% of the control group stated they were not sure.
16.7% of the control group stated they agreed.

Results of the post test were as follows:

65.0% of the experimental group stated they disagreed.
23.3% of the experimental group stated they agreed.
11.7% of the experimental group stated they were not sure.
54.1% of the control group stated they disagreed.
27.0% of the control group stated they were not sure.
18.9% of the control group stated they agreed.

Table 43 illustrates responses to question No. 16 of the pre- and post-tests, where respondents asked to state whether they agreed, disagreed or were not sure of the following statement:

"Nutrition education should be given to both boys and girls."
Results of the pre test were as follows:

48.3% of the experimental group stated they disagreed.
33.3% of the experimental group stated they agreed.
18.2% of the experimental group stated they were not sure.
45.0% of the control group stated they disagreed.
30.0% of the control group stated they agreed.
25.0% of the control group stated they were not sure.

Results of the post test were as follows:

81.7% of the experimental group stated they agreed.
11.7% of the experimental group stated they disagreed.
6.6% of the experimental group stated they were not sure.
54.1% of the control group stated they agreed.
27.0% of the control group stated they were not sure.
18.9% of the control group stated they disagreed.

Table 44 illustrates responses to question No 17 of the pre- and post-tests, where respondents were
asked to state whether they agreed, disagreed or were not sure of the following statement:

"Regular monitoring of nutritional status during pregnancy is beneficial."

Results of the pre test were as follows:

36.7% of the experimental group stated they were not sure.
33.3% of the experimental group stated they agreed.
30.0% of the experimental group stated they disagreed.
50.0% of the control group stated they agreed.
38.3% of the control group stated they were not sure.
11.7% of the control group stated they disagreed.

Results of the post test were as follows:

60.0% of the experimental group stated they agreed.
20.0% of the experimental group stated they disagreed.
20.0% of the experimental group stated they were not sure.
38.3% of the control group stated they were not sure.
ANALYSIS AND RESULTS OF DATA COLLECTED
FROM NUTRITION OFFICERS

Nutrition officers - sample IV was derived from population II. Questionnaire III was administered to this sample. It included 10 items and provided the following responses and results.

Item I a: write down the name of the Maternal and Child Health (MCH) centres in which you are working?
Item I b: your qualification
Item I c: job description

Responses to item a and b are shown on Table 50 below:

Table 50:

<table>
<thead>
<tr>
<th>Name of (MCH) centre in Khartoum Province</th>
<th>Nutrition Officers No</th>
<th>Qualifications B.Sc. Diploma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omdurman Comprehensive Child Health Centre</td>
<td>6</td>
<td>30.0</td>
</tr>
<tr>
<td>El Buluk - Omdurman</td>
<td>3</td>
<td>15.0</td>
</tr>
<tr>
<td>El Daw - Hayq - Omdurman</td>
<td>1</td>
<td>5.0</td>
</tr>
<tr>
<td>Khartoum Model Clinic</td>
<td>2</td>
<td>10.0</td>
</tr>
<tr>
<td>Fatih El Rahman - Khartoum</td>
<td>3</td>
<td>15.0</td>
</tr>
<tr>
<td>El Safis - Khartoum North</td>
<td>2</td>
<td>10.0</td>
</tr>
<tr>
<td>El Shaabia - Khartoum North</td>
<td>3</td>
<td>15.0</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 50 shows that in 7 (HCH) centres there were 20 nutrition officers working - 9- (45%) of whom were university graduates and (55%) were Institute graduates. The majority of nutrition officers (30%) were found in Omdurman Comprehensive Child Health Centre, 15% were in Buluk - "Omdurman", Fatih El Rahman - "Khartoum" and El Shaabia - Khartoum North. 10% worked in Khartoum Model Clinic and El Safia - Khartoum North; 5.0% in Dau-Bagog - Omdurman.

Results obtained from analysis of item 1 of job description, showed that nutrition officers in H.C.H. centres were performing the following activities:-

1- Supervision and training of nutrition guides, usually short in service training courses for 4 month.

2- Educating mothers in the areas of: child care especially feeding practices, immunization and growth monitoring for the under fives. Emphasis is on importance of breast feeding and management of diarrhoeal conditions using ORT.

Responses to item 2a in questionnaire III are shown in the following table illustrating nutrition activities performed in H.C.H. centres.
Table 51:

<table>
<thead>
<tr>
<th>Nutrition Education Activities</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Rating correctly</td>
<td>15</td>
<td>75.0</td>
</tr>
<tr>
<td>II. Weight monitoring during pregnancy</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>III. Discomfort during pregnancy</td>
<td>12</td>
<td>60.0</td>
</tr>
<tr>
<td>IV. Food habits and beliefs</td>
<td>8</td>
<td>40.0</td>
</tr>
<tr>
<td>V. Home activities, exercise, rest and sleeping</td>
<td>15</td>
<td>75.0</td>
</tr>
<tr>
<td>VI. Determinal substance (e.g smoking and heavy work)</td>
<td>2</td>
<td>10.0</td>
</tr>
<tr>
<td>VII. Relationship between optimum nutritional status and health status</td>
<td>10</td>
<td>50.0</td>
</tr>
<tr>
<td>VIII. Relationship between nutritional status and fertility behaviour</td>
<td>2</td>
<td>10.0</td>
</tr>
<tr>
<td>IX. Relationship between nutritional status and acceptable birth weight for the new born baby</td>
<td>2</td>
<td>10.0</td>
</tr>
<tr>
<td>X. Importance of breast feeding</td>
<td>20</td>
<td>100.0</td>
</tr>
<tr>
<td>XI. Infant feeding - multimix of milk supplement</td>
<td>20</td>
<td>100.0</td>
</tr>
<tr>
<td>XII. Methods of weaning</td>
<td>15</td>
<td>75.0</td>
</tr>
<tr>
<td>XIII. Management of diarrhoeal diseases</td>
<td>15</td>
<td>75.0</td>
</tr>
<tr>
<td>XIV. Importance of immunization</td>
<td>20</td>
<td>100.0</td>
</tr>
</tbody>
</table>
The above table 51 shows the distribution of nutrition officers by the type of nutrition educational activities performed in M.C.H. centres. 100% of the nutrition officers offered nutrition knowledge in the areas of breast feeding, infant feeding - multimix of milk supplement and importance of immunization. 75% of the nutrition officers offered nutrition information on topics such as eating correctly, home activities, exercise, rest and sleep, methods of weaning and management of diarrhoeal diseases. 60% of the nutrition officers taught nutrition information on the area of discomfort during pregnancy. 50% of nutrition officers taught the relationship between optimum nutritional status and health status. 40% of the nutrition officers gave instruction on food habits and beliefs. Only 10% of the nutrition officers taught topics such as relationship between nutritional status and acceptable birth weight for the new born baby and the relationship between nutritional status and fertility behaviour.

Topics such as weight monitoring during pregnancy were not mentioned by any of the nutrition officers.

Item 2 b in questionnaire III stated: in what
Table 53:

<table>
<thead>
<tr>
<th>Educational Materials Available in M.C.H. centres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational Materials</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>I A blackboard</td>
</tr>
<tr>
<td>II Posters</td>
</tr>
<tr>
<td>III Pamphlets</td>
</tr>
<tr>
<td>IV Books/Magazines</td>
</tr>
<tr>
<td>V Growth charts (children)</td>
</tr>
<tr>
<td>VI Accurate reliable scales for weight and heights of adults</td>
</tr>
<tr>
<td>VII Tape and Recorder players</td>
</tr>
<tr>
<td>VIII Nutrition Laboratory and/or cooking facilities</td>
</tr>
</tbody>
</table>

Table 53 shows that 100% of the nutrition officers stated that they had growth charts for monitoring children and 70% had posters. 50% of nutrition officers stated they had cooking facilities. Only 5.0% of nutrition officers stated they had blackboards and accurate reliable scales for weights and heights of adults.

Responses to item 2 d in questionnaire II showed that supplementary feeding programmes were mainly directed towards the under-five child. Only in
Omdurman Comprehensive Clinic/Child Health Centre was a breakfast meal offered once per week for pregnant women.

Item 3 a: Are there clearly specified objectives for the nutrition educational activities you offer? Responses to this item in questionnaire III are shown in table 54. 70% of the nutrition officers stated that there were specific objectives. 30% of the nutrition officers said there were no specific objectives for nutrition education in M.C.H. centres.

Table 54:

<table>
<thead>
<tr>
<th>Responses</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>%</td>
<td>70.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Responses to item 3 a revealed the following objectives.
1. To provide nutrition services that help mothers to take care of their children especially those in the early or moderate stages of malnutrition - such as low weight gain or stunted growth.

2. To help mothers understand the importance of adequate nutrition in the prevention and treatment of malnutrition.

3. To teach mothers how to formulate a balanced meal from locally available foods.

4. To teach mothers to make simple recipes for their children.

5. To involve mothers in the process of monitoring their children's growth.

These objectives were stated by 70% of nutrition officers and their distribution - frequency is shown in table 55.
|   |   |  
|---|---|---|
| 1 | 5 | 35.0 |
| 2 | 4 | 26.2 |
| 3 | 10 | 70.0 |
| 4 | 13 | 92.9 |
| 5 | 7 | 50.0 |

The above table 55 shows that the most common objectives is No 4 to teach mothers to make simple recipes for their children (92.9%). This was followed by objective No 3 to teach mothers how to formulate balanced meals from locally available food, and then objective No 5, to involve mothers in the process of monitoring their children's.

Item c Are these objectives relevant to the M.C.H. centre's purposes?

Responses to item 2 c (in questionnaire III) are shown in table 56 below.
Table 58:

<table>
<thead>
<tr>
<th>Responses</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>12</td>
<td>60</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The above table (58) shows responses to item (8a) in questionnaire III. 60% of nutrition officers agreed that the activities they performed were relevant to the achievement of the specified objectives. 40% of the nutrition officers disagreed.

In response to item (8b) - nutrition officers who were not satisfied gave the following future plans:

1. Nutrition educators should be given more training for better qualifications.
2. Nutrition educational activities should be supported financially.
3. Specific nutrition messages and a clear, organized and flexible curriculum plan should be circulated to nutrition officers.
4. Educational materials should be provided.
Item 9 a: Do you think the number of nutrition guides and health workers in the (MCH) centre enough to fulfil the programme activities.

Item 9 b: Are they trained enough to perform nutrition educational programme?

Responses to the above items are shown on table 58 below.

Table 59:

<table>
<thead>
<tr>
<th>Evaluating number and training adequacy of the Nutrition Educators and Health Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>responses</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

The above table 59 shows that 65% of the nutrition officers thought that the number of nutrition educators and health workers was not enough to fulfil the programme. 35% thought the number of the health workers and nutrition guides was enough. Responses to item 9 b show that 70% of the nutrition officers thought that health workers and nutrition educators were not trained enough. 30% of them reported that health workers and
nutrition educators were trained enough.

Item 10: Are there nutrition/education experts attending the health centre who participate in organizing the nutrition activities?

Table 60 illustrates responses to item 10 in questionnaire III.

Table 60:

Nutrition/education experts' attendance and participation in organizing nutrition education activities

<table>
<thead>
<tr>
<th>Responses</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

The above table (60) shows that 90% of the nutrition officers admitted that nutrition/education experts did not attend the health centres and participate in organizing the nutrition educational activities. 10% of them admitted that some nutrition/education experts did attend the health centres and participate in organizing the nutrition educational activities.
Analysis and results of data collected from nutrition education/experts
"Interview guidelines"

Table 1:

<table>
<thead>
<tr>
<th>Question</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is there an overall stated philosophy and objectives,</td>
<td>12</td>
<td>100</td>
</tr>
<tr>
<td>formulated policies and strategies to direct and guide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nutrition educational activities in M.C.H. centres?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes, as part of the National health plan but needs revision, to more</td>
<td></td>
<td></td>
</tr>
<tr>
<td>specified objectives and related to nutritional problems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Is there a nutrition education system responsible for planning,</td>
<td>12</td>
<td>100</td>
</tr>
<tr>
<td>organizing and implementing nutrition educational activities?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. How can nutrition educational</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
programmes be organized in M.C.H centres?

- integrated within relevant programmes 6 50
- should be in separate units, having separate time and budget. 4 33.3
- be separate activities. 2 16.7

Who should organize, and teach nutrition, learning experience in M.C.H. Centres?

<table>
<thead>
<tr>
<th>Role</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse-midwives</td>
<td>12</td>
</tr>
<tr>
<td>Trained &quot;Traditional&quot;-Midwives</td>
<td>8</td>
</tr>
<tr>
<td>doctors</td>
<td>4</td>
</tr>
<tr>
<td>Health workers</td>
<td>4</td>
</tr>
<tr>
<td>trained local leader in the village</td>
<td>3</td>
</tr>
<tr>
<td>religious leader</td>
<td>3</td>
</tr>
<tr>
<td>school teacher in rural areas</td>
<td>2</td>
</tr>
</tbody>
</table>

Have the nutrition officers a leading role in the organization and evaluation of the learning experience in M.C.H. centres and in the country?
organizing day to day activities.

At country level the policy makers have the role of organizing learning experiences.

6 Is there a nutrition education system responsible for the evaluation of the nutrition educational programme performed in M.C.H. centres?

No 12 100

In addition to the above responses, nutrition education/experts stated the following comments:

1- The available facilities in M.C.H. centres are inefficient. Funds are too limited and not reliable to suffice the needs.

2- From time to time there was a sort of coordination between activities, directors of Nutrition Division in Ministry of Health and directors of School Gardening and Nutrition Division, Ministry of Education, to check the actual needs and utilize the available human and other resources.

3- In the country there are nutritional problems and
educating mothers is one component measure that can solve them. Reasons for such problems were listed as follows:

(a) Lack of nutrition knowledge in the area of nutritional requirements.

(b) Lack of nutrition knowledge on part of mothers related to food and detrimental to the nutritional status of human beings.

(c) A low food intake by pregnant women, will enable them to have small babies believing it helps delivery. The following beliefs are also common. Intake of eggs during infancy will make the child speechless, breast feeding, and some foods especially eggs, meat and milk should be withheld from sick children; breast-milk of a pregnant women is harmful to the child.

(d) Late introduction of warming foods. Moreover these foods were mainly starchy.

(e) Children are treated as adults, and are given food after serving the adult men.

(f) Widespread custom of allowing men, their guests and boys in the family, to be fed first.

Some nutrition education experts stated that factors causing malnutrition with emphasis on diarrhea were:

1- insanitary environment.
They all agreed that nutrition should be integrated with all health services as a main part of preventive medicine since neonatal death rate and low birth weight are all associated with nutritional status and dietary intake along socio-economic gradient and cultural sinews.

They all agreed that there was (and still) urgent need for the establishment of a National Council for nutrition which will co-ordinate the activities performed by Ministries of Health, Education, Agriculture and Finance and Planning.

They all agreed that there was a need for nutrition research activities. Generally the nutrition experts suggested that for illiterate mothers, simple talks, about foods and food groups, distribution of food among family members, food preservation, feeding during pregnancy and lactation, emphasis on breast feeding, weaning foods preparation from local available food materials, coupled with health education with emphasis on personal hygiene, environmental health, and drinking water, family health, income generating activities, handicrafts, kitchen gardening, poultry raising, how to overcome seasonal shortages of food, kitchen accidents, analysis and improvement of local recipes.
10- They all agreed that this simple talk should be delivered by indigenous midwives if nutrition educators are not available.

11- All experts agreed that any curriculum plan should consider socio-economic and cultural factors that influence nutritional behaviour of the target group.

12- They also agreed that (M.C.H.) centres, rehabilitation health centres and homes are the best places to get women gathering.

13- Some nutrition experts suggested that growth monitoring and food demonstration were the best information for mothers while face to face counselling and home visits were the best methods to reach and teach women, especially illiterate and low income families.
Part II
Discussion of the Findings

This research attempted to answer the questions of the study concerning four major tasks of programme development: formulation of educational objectives, selection of learning experiences, effectiveness and efficient organization of learning experiences and evaluation procedures. This part was planned to view results and discuss findings in relation to these four tasks.

Formulation of Educational Objectives

Questions raised in this area were:
- Are there specific objectives for nutrition educational activities in maternal/child health M.C.H. centres?
- Are these objectives relevant to nutritional problems facing pregnant women attending M.C.H. centres?

Findings in this respect revealed that 100% of the nutrition education experts and 70% of nutrition officers were in agreement that there were specific objectives for implementing nutrition education in M.C.H. centres.

71.2% of nutrition officers to some extent could see the relevance of these objectives to the purposes
of M.C.H.

All nutrition education experts agreed that objectives need to be more specified and related to specific nutritional problems of specific target groups.

Obviously, source for formulation of objectives could be local documentation, such as reports on nutrition from the nutrition division, Ministry of Health, in addition to medical report, agricultural surveys and research work. People locally concerned, such as midwives ("Hella midwives") can help in determining objectives.

The World Food Conference organized by FAO (1974) had emphasized the urgency of accelerating efforts to use nutrition education as a tool to improve nutritional status in developing countries and recommended that:

Governments include nutrition in the curricula for educational programs at all levels and that all concerned in the fields of agriculture, health and general education be appropriately trained to enable them to further the nutrition education of the public within their respective domain.

That conference called for broad measures for elimination of malnutrition and hunger and for the
implementation of national food and nutrition and educational policies.

The fact that many nutrition problems can be prevented and causes of each are multi-factors stemming from the vicious circle of diseases, ignorance and poverty that call for integrating nutrition educational objectives as an important component in national development as well-targeted group programmes.

Selection of Learning Experience:

Questions three - six of the study were about selecting learning experience. Such questions were:

- What type of nutrition educational activities are performed in maternal/child/health centres?

- Are facilities needed for carrying out the learning experiences available and adequate in each M.C.H. Centre?

- What type of information needs to be formulated and introduced to mothers attending M.C.H. centres?

- What do mothers attending M.C.H. centres know and perceive about food and nutrition?

Findings drawn in relation to type of nutrition activities performed in maternal/child health centres revealed, 100% of nutrition officers addressed to
during pregnancy was poor in fruit and fresh vegetable group and milk and milk products group. Meat group food intake was marginal since egg, fish and legume had been rarely mentioned (see table 6—9). Consequently deficiency of nutrients such as calcium, vitamin A and vitamin B complex should be expected. Evidence from table 49 confirmed this expectation.

Some harmful food habits were prevalent such as:

(1) Restriction of the total of food intake in two ways.

(a) Reduction of number of meals being in the range of 1-2 meals per day, while before pregnancy majority of respondents reported 3 meals per day as their usual dietary pattern (see table 8).

(b) Avoidance of many food items including the staple kifra, milk and fermented sorghum foods (see table 7). Baasher et al (1982) stated that, "in the Sudan, Nigeria and Yemen, women avoided many foods during pregnancy and this restriction of total food intake was always harmful to marginally nourished women." Bancer (1982) added that pregnant women in the Sudan believed that they should eat less so that the foetus would not grow big and this cause labour difficulty. In this particular study (see table 7) high percentage of respondents reported the same belief.
(2) Habits of eating strange things such as mud and clay reported by (38%) and smoking reported by 1.7% are all harmful. Such practices either restrict total food intake or reduce the beneficial effect of nutrients, smoking especially.

(3) The habit of allowing men and their guests to be served first raised the question of whether the respondents could receive their necessary food requirements. Badri (1984) reported that in Sudan men and their guests were given the best food in terms of quality and quantity. They were served first, even before children. In this study 85% of respondents reported they served men and their guests first.

However judgements on the adequacy of diets invariably depend on comparison of actual food intake with estimates of the standardized requirements. In this study it was not possible to compare the collected data on the actual quantity of recommended allowances except for 6 respondents. Instead of weighing food and recording, the results obtained from analysing data from the 24-hour recall method and responses from relevant questions in section 3 of questionnaires I and II were used to collect information on the quality of the respondent's dietary
intake described.

Generally the respondents came from different regions of the Sudan and their dietary habits were characterized by regional differences. These differences are probably not pronounced in Khartoum Province where all ethnic groups are represented and are more or less mixed. Thus what is perceived as typical Sudanese ethnic food may not be easy to identify. Though generally for people from Western Sudan, Dukhn "millet-cereal," made into thick porridge and mixed with milk and ghee could be considered staple ethnic food. People in Northern Sudan consume wheat flour in form of thick flakes or pancakes called Gursa eaten with meat stew plus okra or with milk.

However it is rather erroneous to conclude that many Sudanese ethnic foods are not consumed in Khartoum Province; if not everyday, occasionally. However, the discussion of dietary habits would be incomplete without investigating the role played by the extended family. 66% and 80% of respondents reported that their source of information were mainly their mothers, husbands and other relatives. Thus mothers could play role in formulating food habits during pregnancy as well as in infant feeding practices. Al-
Mokhalalati (1982) had found, marital status had more effect in changing Sudanese habits than food price and availability. Al-Mokhalalati (1982) reported that Arab women found food preparation as one of the most satisfactory way of caring for the family and thus length of time needed to prepare traditional staple foods rather than use of convenience food was not important factor. Moreover, these women rarely had they eaten outside their homes.

It is worth noting that most of the foods avoided by respondents were in short supply, most probably because of high price. Examples of these foods were milk, egg, fish, meat and fresh vegetables. These foods were and still are very expensive and hardly obtained through the right channels which sell food at the official price.

Another context concerning dietary habits among respondents was their food preferences (see table 6) which could greatly influence the amount and the kind of food to which these respondents were exposed. As Sanjur and Romero (1973) said:

"the phenomenon of food preference is not clearly understood. What is clear is that a feasible frame-work is needed to support an empirical examination of the phenomenon." Thus since such measurement which may explain factors behind food...
...food habit can be explained by using Lewin's model called the channel theory that was described by Sanjur (1982) as follows: All food move step by step through channels. The nature and number of channels vary from culture to culture. These channels are controlled by persons called the gatekeepers. Thus to modify food habits within any group it is fundamental to identify the gatekeepers and the channels they control. In this study authority figure who influences food selection, preparation and distribution was investigated (see table 12). The majority (67%) of the respondents reported that food selection was done by their their husbands. But other activities of food and nutrition such as preparation and distribution were women's concern. Accordingly, application of Lewin's channel theory would require that both the wives and husbands to be identified as gatekeepers and forces such as culture, income level and personal characteristic, are the channels.

Nutrition knowledge and attitudes of the respondents:
about nutrition and food. At the same time these tests served as a pre-test to the experiment i.e. development of the instructional content of the proposed educational programme, implemented in Khartoum Model Clinic for Maternal/Child Care.

For results of the pretest - question No. 1 concerning definition of the word nutrition showed only 11.7% of the experimental and 8.3% of the control group were able to give the correct definition. When investigation was made on the educational level of those respondents it was found that: 57.1% of the experimental group who gave the correct answer were university graduates, 42.9% of them had attended a three-week nutrition course. 60% from control who answered correctly had a two-month nutrition course offered in School Gardening and Nutrition Education Division, Ministry of Education. 40% of them were university graduates.

The majority (80%) of the two groups who were unable to define the word nutrition gave the
(iii) Nutrition is to eat good food and become fat.

(iv) Nutrition is to eat healthy food which contains vitamins.

(v) Nutrition is cooking delicious dishes such as custard pudding and cakes. So from these expressions it was clear that knowledge of nutrition terminology was lacking. It was observed that the word nutrition was perceived as synonymous with the word food.

Results of the post test showed that 65.0% of the experimental group were able to recall the meaning of nutrition, while 18.3% from the control group were also able to answer correctly. This gain in knowledge was attributed to fact that the researcher had no means to separate the two groups and prevent them from meeting and talking about nutrition. Generally improvement of the experimental group's score in the post-test was attributed mostly to part I of the test which required knowledge of specific facts to be
due to urban exposure, since the majority reported their home origin was Khartoum. Such information would be expected to add to respondent's ability to answer some questions correctly.

In Part II of the test which required attitudes orientation and then application of the knowledge, although the experimental group showed positive attitudes direction but also the control group was affected. This lack of large difference between the two groups could be due to the fact that respondents being housewives responsible for food preparation, had mastered the skill of meal planning before having the theoretical nutrition knowledge included in the programme and thus little or no improvement resulted in the attitudes from the programme. Emons and Hays (1973) said: "Practices of mothers were more sound than their nutrition knowledge," while Newell et al. (1985) found that, whether respondents possessed nutrition knowledge before the intervention or obtained it during the nutrition educational programme, nutrition knowledge was related to dietary quality.
In this particular study, because it was believed dietary habits change slowly, theoretical knowledge gained by the experimental group was expected to create awareness in the importance of food and nutrition during pregnancy and lactation. This awareness was expected to create positive attitudes toward acquisition of nutrition knowledge. Accordingly, this might slowly lead to beneficial dietary behaviour provided that motivational factors and objectively oriented nutrition messages were properly introduced, to solve specific identified nutritional problems.

However, Church (1971) in writing about a specific nutrition problem, *kwashiorkor*, described a common situation where a defined target - mother, after education, using lectures, posters and films, could neglect the food useful in prevention and cure of *kwashiorkor*, while their children's condition was clear evidence, that no change in feeding habits had occurred. In writing of this problem Church (1971) described rote learning experience unaccompanied by behaviour change as "the lecture - poster barrier", which can be crossed by designing programmes that secure active involvement of the respondents.

(iii) Nutritional and health status of pregnant women
Finding in table 4-5 reflected the nutritional and health status of respondents. As noted before, the final objective for any nutrition educational programme, is achieving optimum nutritional and health status. These two determinants are assessed by two main components namely food intake and health of the individual. These in turn are functions of 6 major factors described by Call and Liveson (1973) in the following fig. 6:

From this diagram six determinants for nutritional status were identified. In the present study three out of the four main methods used for assessing nutritional status were attempted - namely anthropometric, biochemical and dietary intake. Calliendo (1979) said: "The four
methods, anthropometric, clinical examination, biochemical and dietary intake are far from being completely accurate and reliable. Frequently surveys may raise more questions than they answer."

Anthropometric measurements had been used for a long time to assess malnutrition, but the association among them had received little attention.

Thus in this particular study, effort to explore association between anthropometric (weight gain during pregnancy - table 5) food intake appraisal - table (4), and the final outcome, that was birth weight (table 20), the researcher observed that these answers were not mutually exclusive but rather independent, suggesting that other factors not easy to identify and measure are playing a role. Such factors could be the presence of infectious diseases (malaria, anaemia, worm infestations) as well as underlying cultural socio-economic factors which can be contributing to poor dietary intake and health care. These could become a very interesting issue deserving further exploration and future work.

Data concerning weight gain during pregnancy was lacking in the Sudan so results
obtained; that was mean weight gain for the two groups 4.9 kg (Table 5) can't be related to the expected ideal weight gain in relation to the height, as should be. This finding was in agreement with the results - 5-0 kg weight gain found in Nigeria, when Hauk (1963) weighed 100 pregnant women attending health centres.

Thompson et al (1966) reported in Gambia, weight gained by pregnant women varied from 2.7 to 5.5 kg. While Shah (1981) reported extreme variations in weight gain from 11.7 kg and 17.0 kg in United Kingdom and United States to 5.3 kg in primiparae and 6.2 kg in multiparae in South India from the 12th week of pregnancy on ward. Weight gain during pregnancy and its relation to birth weight and to adequacy and duration of breast feeding had been reported by several researchers. Shah and Shah (1972) reported a strong correlation between weight gain during pregnancy and birth weight. While Shah (1981) reported, the fat women in developed countries store during pregnancy when their weight gain is 12kg & above support them during the third trimester and during lactation.

From educational point of view the problem of low weight gain, observed in this study can be solved by (1) identify the causes - whether it is food habits, economic or due to presence of
illness. (2) Nutritional advice on - eating right for your growing foetus and for your own sake. (3) Reinforcement technique described by Templeton et al (1978) can be applied to those who are at risk - or their weight is very low. Such technique which involved educational activities can be stated as follows:

Positive reinforcement could be used to encourage weight gain, meeting attendance, home visits. Following the monthly weight and then the 15-day weight each respondent could be seen individually to: (a) record, graph and reinforce weight gain, (b) establish a weight goal for next month, (c) discuss problems that hinder weight gain. In addition to positive verbal reinforcement an incentive in form of money or kind can be arranged. Orkow (1978) stated that "individual continue behaviour that is rewarded and discontinue behaviour that is not."

Findings on height of respondents revealed an average of 153 cm. According to Sudan Maternal Formulary (1979) this average compared well with medium frame - height ranged 136 -155 cm. Hytttn and Leitch (1964) had found a consistent association between height and/or weight of the mother and birth weight, while Shah (1981)
during pregnancy revealed, 20% of women were considered anaemic. Hookworm infestation was found in 18.3% (see table 4). Thus anaemia might be expected among those respondents. Roche and Layrisse (1966) reported that blood loss averaged 0.03/ml per nector "perhaps five of this amount is consumed by old world hookworm Ancylostoma?"

Numerous researchers from Fulleborn et al (1928) to Villarjoce (1970), had pointed to absence of hookworm anaemia among population, diet rich in iron and protein. Thus in this research the researcher found it hard to explain absence of marked anaemia on a basis other than dietary factor especially if the poor dietary intake (table 9) is put in mind and the fact that cereal based diets have the problem of phytate which interferes with iron absorption.

Elnagit (1966) had described treatment of anaemia during pregnancy in Sudanese folk medicine, where an axe was boiled in water over night. The resulting fluid was then poured into a bottle and the pregnant woman was instructed to
have a small coffee cup full twice daily. Also liver of dove as well as raw liver of birds and chicken was given. Thus iron deficiency anaemia was known to be present long time ago - as it appeared in folk medicine.

The importance of combating anaemia could be drawn from what had been reported by Baker and De Maeyer (1979) - pregnant women who are anaemic show greater risk of premature delivery, increased maternal, foetal mortality and morbidity.

Someswara (1974) reported that prevalence studies carried out in Iraq, Jordan, Lebanon and Sudan showed that 20%-40% of adult women suffered from varying degree of anaemia. In the vulnerable groups such as infant, pregnant and lactating women the proportion of anaemic reached 70-90%. The predominant type of anaemia is that of iron deficiency. Thus nutritional measures directed at increasing the iron intake of vulnerable groups as well as combating factors that contribute to onset of anaemia such as malaria, worms, as well as dietary constituents such as phytate, should be considered.

De Maeyer (1981) said "parasitic infections increase women's iron requirement. Nutrition education can modify some food preferences that
decrease iron absorption and intake," Yet De Maeyer (1981) saw nutrition education as a slow process and therefore urged iron/folate supplementation.

Nutritional status of the lactating mothers and their infants:

Results of the longitudinal study, six months after delivery were presented in part I of this chapter.

Refer to table 13, 32.5% from each of the two groups delivered in public hospitals although as a general rule these hospitals did not accept normal delivery except for 2 hours after delivery. Very little amount of money had to be paid. Some respondents reported that public hospitals charged less money than delivery at home by midwives. It is important to note that Baird (1953) had grouped pregnant women into 5 groups according to place of delivery and access to medical services. He reported, nursing in the home was better, with a lower incidence of still birth, neonatal mortality and premature babies. Baird (1963) reported, women who enjoyed good standard of living and nutrition were better equipped to face rigours of pregnancy, labour and the puerperium and their babies were heavier. Findings of this study did
not figured variation amongst respondents in the social classes that can be related to place of delivery. All respondents when got home, were looked after by their relatives for 6 weeks after delivery.

From table 3b the mean birth weight of the infants 3.05 kg was in close agreement with the local standard put down by Sudan National Formulary (1979). This mean was much better than what had been reported by Modawi (1963) for infants in Khartoum and Juba hospitals as 6.6 pounds or 2.97 kg. Modawi considered arbitrary limit of 5 pounds for prematurity. He reported, thus definition of prematurity put down by the World Health Organization, WHO (1948) might be applicable to European countries but not satisfactory for the Sudan and other developing countries with low mean birth weights. It was observed that African babies weighing 5 pounds were clinically mature and thrived better with minimal medical care than European babies with equivalent weight. Modawi (1961) listed the following factors that contributed to incidence of low birth weight in the Sudan:

1- Tobacco smoking - in Southern Sudan.
2- Seasonal scarcity of food.
3- Nutritional and social background - women in Juba.
being mostly vegetarians since meat and fish were occasionally eaten and egg were traditionally tabooed for pregnant women. Women were a working class even during pregnancy they worked in the field and in the house. They believed the harder the women work the easier the labour.

An increase in income in 1956-1960 witnessed an increase in the birth weight from 6.4 pounds to 6.56 pounds.

4- Endemic disease like malaria.
5- Minimal antenatal care.
6- Racial and genetic factor - maternal stature.
7- Sex of the baby - boys were heavier than girls by a quarter pound.
8- Multiple pregnancy.
9- Parity - the first baby was lighter than subsequent siblings.
10- Length of gestational period.

Findings of study though indicated the presence of some of the above mentioned factors - namely, malaria, anaemia, worm infestations and low food intake but it was not easy to identify their association with birth weight.

Generally 71.6% babies from the experimental and 46.6% babies of the control group their birth.
weights were in the range of 2.75 and 3.75 kg (see table 20). Comparing this findings with what had been reported by Modawi (1963) on prematurity, these birth weights were satisfactory, if compared to the nutritional status of their mother, since Shah (1981) had reported, the major contributing factor to low birth weight was the mother's chronic malnutrition.

In addition to birth weight, method of infant feeding was investigated. Breast feeding started in the first week by the majority (93.0%) from each of the two groups. This percentage dropped to 75.0% by the end of the first month. Reasons given by mothers were: being worried that their milk might not be enough for the baby. Other reasons reported by those who had not initiated breast feeding were: nipple soreness, cesarean section, babies were too weak to suck and Lack of milk. Obviously this percentage (7.0%) was high compared with what Dwyer (1976) had estimated; that "only one percent of mothers had serious breast feeding problems and two or three had temporarily problems due to illness." Thus percentage found in this study coupled by the declining percentage requires further investigation since human milk has been recognized as a national resource in economic, agronomic and nutritional planning.
Jelliffe and Jelliffe (1975) reported that in Kenya it was estimated that the $11.5 million loss in breast milk was equivalent to two-thirds of the health budget.

Findings from study did not only pointed to declining in breast feeding but also to wrong ways of sudden weaning reported by 70.0% from each of the two groups. Another problem is the early introduction of sugared water. Traditionally from the first hour after birth new-born babies are given boiled cold water to which is added pinch of salt and sugar. The significance of this tradition needs further study and investigations. Some of the privileged women in this study used to give their infants glucose solution bought from drug stores.

Early introduction of foods interferes with amount of milk the baby sucks and in addition the problem of infant diarrhoea, which was a common clinical observation. This could be due to this early introduction of sugar and salt. May be because of this reason that Sharali (1967) had recommended that in the Sudan infants should be exclusively breast fed, up to six months.

Thus from educational point of view mothers need to be informed in the importance of breast
the researcher has chosen most important aspects which are essential to enable health personnel to fulfill their role. In addition to this list the relationship between breast feeding and birth control measures should be considered.

In fact the problem faces nutrition or health educator is not a scarcity of information so much as the method of communication and feedback which are needed to adapt the information to the end user's needs. This obviously needs a multidisciplinary approach including practitioners: sociologist, anthropologists, economists, agronomist, and specialists in nutrition-related fields. An official communication system is also needed to reach targeted vulnerable groups and the public. This could happen through the available mass-media and through various publications in form of pamphlets and posters.

An important component for effective communication is the development of curriculum for nutritionists who are to be the providers of any designed educational programme. The process of development of such programs will be theme of the next part of this chapter.

(iv) Socio-economic and household variables:

Efforts to formulate compatible and
objectively oriented nutrition messages for the respondents, would be incomplete without consideration to socio-economic variables that may affect the educational process and consequently the respondents' involvement and participation. In this study socio-economic baseline data collected included the following variables:

(a) Family's income.
(b) Respondents' educational level.
(c) Respondents' occupation.
(d) Household characteristics and facilities available as well as household's food production such as horticulture and animal husbandry practices.

(a) Family's income:

Family's income as shown in Table 16 ranged from 200 to 3100 Sudanese pounds per month. There was in Table 2 in the Statistics Year Book 1973 Section XIII almost 82.0% of rural inhabitants earn 200 Sudanese pounds or less, while this was true of only 28.0% of urban dwellers.

This difference in income implies different food intake quantitatively and qualitatively. Basili (1987) said: "According to class position and income level in the Sudan, cereal account for 10% of the total expenditure on food and drink"
among high income group; twice that amount among the upper middle and lower income groups, while among poor urban families cereal account for 25.0% of the total expenditure on food and drink."

Babiker (1984) said: "Over 51.0% of the capitalists in the Sudan spent more than Ls4000 annually on food. 40-45% of the businessmen spent about Ls100-400 per month on food." These findings correlated positively with what had been reported by Sanjur (1982) that changes in the composition of the daily diets which can be measured by monitoring percentages of total energy intake derived from different food groups. At low income level starchy staple are principal source of calories. With income increases starchy staple declined and intake of fat and oil, meat, fish and dairy products increased. This scholar also reported that Engel's law qualitatively related to income level to food spending behaviour. This law predicted that at higher income level total food expenditure increased in absolute terms but decreased as a percentage of total income. Finally Sanjur (1982) indicated that income or purchasing power was a significant determinant factor of food consumption behaviour. In the long run and over broad income changes, a significant relationship between food expenditure pattern and
income level exists.

This relationship is part of a system in which economic and socio-cultural factors strongly interact. This interaction may need a thorough search for food consumption behaviour pattern which is beyond the scope of this study. Thus briefly the information collected about family's income was not of great help in the formulation of the instructional content since more than 65.0% (see Table 27) admitted that their husbands did the shopping for food and since there was no information about by whom the family budget was distributed.

(b) Respondents' educational level:

Findings presented in table 14 revealed, 56.0% of the two groups their education level ranged between general secondary (9 years) and high secondary (12 years) schooling. 20% to 26% had not been to school.

The positive relationship between formal educational level and acquisition of nutrition knowledge and consequently improvement in dietary practices had been reported by many researchers. Seiler and Fox (1973) reported income, education (general) education (specific) had a direct association with ability to choose better quality
diet.

In this particular study, investigation on the level of formal education of the respondents helped in selecting teaching methods as well as formulating the learning experiences. For example, nutrition counseling sessions held with illiterate women took the form of repeating the message, using simple talk and in most cases the researcher encouraged the respondents to speak about their nutritional problems.

Corollary results of the pretest which revealed lack of knowledge concerning the scientific terminology of nutrition and food, had suggested that there was no need to talk about nutrients such as folic acid or β carotene or protein and amino acids. Instead the respondents were encouraged to eat food items that are sources of these nutrients. It was also absurd to talk to illiterate about milligrams or micrograms of this or that vitamin. Instead household utensils measures that were available such as glasses, teaspoons, and teacups can be used for measuring food and fluid intake.

(c) **Respondents' occupation**

The analyzed data showed that 73.1% were
housewives (see table 29), 26.7% were working outside home.

Lanee (1975) reported that families with employed homemakers consumed more calories, iron, thiamine and vitamin C than did households of unemployed. Sanjur (1982) reported that employed homemaker might spend less time in the home and with food preparation and therefore may substitute a market service or convenience foods for food prepared in the home.

In the Sudan like other developing countries food industry is limited and convenience foods are not available. So the employed homemaker has to do food preparation herself or hire somebody or rely on the extended family members. Thus such homemakers are in fact in need of educational help in the area of home management, particularly, time and money management. The researcher observed that some of the respondents complained of lack of time to accomplish the home activities, social obligations and events as well as work outside the home. Another complaint was the short maternity leave and high cost of the private nursery schools and the hired "nannies" or baby sitters.
(d) Household Characteristics and Facilities Available:

The interviews and observations made revealed, in 38.3% to 41.7% of households, respondents used to breed animals, mainly goats and sheep. Poultry raising was found in 35% to 53.3% of households, while vegetables were grown in 33.3% of the households (see table 18). It was observed that animal husbandry and poultry raising were predominantly in households where near by, there were small cash food crops farms. Some respondents reported that from such farms they got fodder for the livestock and poultry.

Respondents also reported that the food products produced in the households such as eggs, milk and meat were used for household consumption only. This evidence implied that either such products were very little to meet the demands of the family or the respondents were shy to say they used to sell the food, since selling home-food was shameful in Sudanese culture. Mustafa (1963) reported, in West of Sudan it was considered an ethical to sell food.

In Central Khartoum food production practice in the household is declining. Reasons given by some respondents were: their homes were small; price of fodder was high; lack of technical
knowledge about growing vegetables or raising poultry. Results of the pre- and post tests showed, that 60.0% from each of the two groups did not think that poultry keeping was more cheaper than buying eggs and meat.

It is worth noting that in 1987 F.O.A. had held a seminar on "Women's role in agriculture." Documents contained information such as: in both pastoral and farming communities in Sudan, women do over 90% of the domestic and farming as well as food crop production and goats and cows breeding - including milking. One of the recommendations put was that policies geared toward women's access to technical information, domestic programs on nutrition, health, child care and livestock raising should be encouraged.

Obviously food supply of households depends on many factors - mainly household production and household expenditure. Each factor is influenced by other factors such as access to land and production resources including knowledge of farming, family income as well as natural food supply, price policy, trade policy and food subsidies. There is growing evidence that increasing food supply for export has a negative impact on food production for home consumption. Therefore there is a need to monitor changes in
the quantity, quality, source and cost of food available to the different socio-economic groups.

From the educational point of view, women need knowledge on the nutritional value of foods produced in the home, food supply system, price policy, percentage of income spent on food as well as marketing and money value of the food. Facilities other than food which have impact on nutritional status included in the study were: access to water, kitchen availability, number of rooms, availability of electricity, radio and television and means of waste disposal.

Access to a water source is particularly important in a hot climate like the Sudan. 5% of the households had no tap connected to them. Water for drinking was kept in clay jars (zeer). Shazali and Erwa (1971) examined water samples from 25 zeer in Khartoum and found 9 of them were contaminated with E. coli, although the clay jars had been filled with chlorinated water.

Thus educational programmes that encourage use of safe water and help respondents how to protect water from avoidable pollution caused by laundry activities should be considered.

Type of the houses and number of rooms
available were important since researchers like Zumrawi et al. (1984) had reported, crowding was one of the important factors that might lead to malnutrition.

Cooking facilities and availability of a kitchen though important, but in the Sudan kitchen is the most neglected area in the house. Kitchens observed in this study were found to be small, dark, with or without windows, hot and hardly furnished. Very few were found to be equipped with shelves or cupboards. Cooking was observed to be on charcoal stove on the ground.

Refrigerators were found in 72% to 66.7% of the households. Refrigerators were not put in the kitchen and this necessitates going to and fro, which is energy-consuming.

Generally suitable facilities are important in helping the respondent performing household activities. Sanjur (1982) reported, types of cooking appliances owned by a family influenced the type of food prepared and thus consumed.

Availability of radio and T.V. in the household as a means for communication is becoming very important in urban and rural areas. Manoff (1973) reported on the power of media to capture
the minds of people, influence their habits and practices and change their way of life.

In this study (see table) television sets were found in 72% of the households while radio was in about 25% of the households. Thus television could be the most influential communication medium. Next to television, radio could play an important role. Radio listening is significant in the rural settler and nomadic area. Because nomadic people are usually highly mobile, transistor radio will be an attractive medium for them.

The fact that in the Sudan there are various languages as well as ecological and cultural differences, all of which affect the interpretation of messages and the use of mass-media as an effective communication channel.

This variation and language barrier create a problem in preparing nutrition messages unless a target population with a definite problem is identified. Another problem is that in the Sudan radio and television programmes are controlled through the government and so an administrative supportive policy is needed before establishing any air programme.
Effectiveness and Efficient Organization of Learning Experiences:

The seventh to the eleventh questions of the study were about the organization of learning experiences and educational programmes performed in M.C.H. centres. Such questions were:

- Is there a nutrition education system responsible for the planning, organizing and implementing nutrition educational programmes in M.C.H. centres and in the country?
- How can nutrition educational programmes be organized and introduced in M.C.H. centres?
- Who should organize and teach nutrition in M.C.H. centres and in the country?
- Are the teaching methods and techniques used in M.C.H. centres lead to organization of the learning experiences?
- Have the nutrition officers a leading role in M.C.H. centres?

Findings drawn in relation to the existence of nutrition educational system revealed three groups of responses. 60% of the nutrition officers reported there was nutrition educational system, referring to the Nutrition Division, Ministry of Health. 30% of nutrition officers reported there was and that was the School Gardening and Nutrition Education Division,
Ministry of Education. 40% of nutrition officers they did not know exactly whether there was a system or not. The best explanation for this variation of responses could be due to the fact that nutrition activities in M.O.H. centres had been recently implemented.

Findings drawn from nutrition education experts concerning the existence of the nutrition educational system revealed that, 100% of them reported there was, referring to the Nutrition Division, Ministry of Health.

Findings in relation to how nutrition educational activities organized and introduced revealed two broad opinions. One opinion suggested integration of nutrition educational programme with relevant programmes such as supplementary feeding programme, or with family planning programme, or with ante natal care. The other opinion suggested that nutrition educational activities should be a separate activities unit having a separate timetable and budget.

Whether nutrition educational activities should be given a separate place in the health educational programmes or whether they should be integrated into existing health activities and services such as family planning, depends on
facilities and human and resources available in M.C.H. centres. Abbasy (1974) reported, programmes of nutrition education should be integral parts of larger programmes of improvement and utilization of available food supplies in a country.

Findings in relation to who should organize and teach nutrition in M.C.H. centres revealed that 100% of nutrition officers said home economists, since in the Sudan there was no specialized B.Sc nutrition courses or graduates.

Nutrition education experts reported various categories of personnel who could take the responsibility for organizing and teaching nutrition education in M.C.H. They included doctors, nurses, midwives and health workers as well as social workers and home economists. At country level all these categories can teach nutrition. In addition trained local leaders in the villages, religious leaders, generally because nutrition education is needed by everyone throughout his life, the organization and planning of nutrition activities should be horizontally and vertically looked upon.

Persons responsible for planning and preparing food for groups whether in the home or
participate in the learning experience should be encouraged. The use of films was found to be useful in teaching nutrition in M.C.H. centres.

They all agreed home visits for follow-up would be best way to create a motivational atmosphere.

Findings drawn in relation to whether nutrition officers had a leading role in organization and planning nutrition educational programme revealed, 60% of the nutrition officers said: "no" while 30% said: to some extent, in some M.C.H. centres.

Nutrition education experts reported that nutrition officers had the leadership role in organizing day-to-day nutrition activities in the M.C.H. centres. At country level, the policy makers had the leading role in programme planning.

The Ministry of Health (1988) stated the following: "At present planning and programing are done more or less on adhoc basis in the Ministry of Health. There is no mechanism for continuous monitoring to provide feedback for decision making by the technical and/or administrative decision makers." The dynamic of food and nutrition indicates there are special dietary needs at different ages and different conditions
of health, such as infants, pregnant women, ill and old people. Thus the need for education in food and nutrition has become an integral part of lifelong learning process. It is not only significant in the vertical dimension of life, but it is equally important in the horizontal dimension. That is to say, nutrition and food habits have their root, applicability and practice in the home, in school, in agriculture, in health and folk medicine, in social and religious ceremonials, in industrial productivity and in national development process as a whole. This unique position of nutrition in human life calls for horizontal integration of educational effort.

This implies a multidisciplinary and well coordinated approach must be followed in nutrition education planning so that programmes are horizontally and vertically integrated.

Programme planning should take into account local conditions, needs and problems regarding food and nutrition. Factors such as availability of trained manpower, urgency of changing certain habits, and vulnerable groups in the society should all be taken into account. Systematic study of applied nutrition and problems of food and health is important for organising the
educational programme content in terms of units, sub-units and concepts.

These concepts should be integrated with the culture, the religious traditions and sacred values of people. Richie (1967) said: "Nutrition education can not be successful unless based on a knowledge of the attitudes, beliefs and values of the people to be influenced and how they passed these on to their children; and on an understanding of those concepts of human behaviour which relate to food solutions and to spread of innovations."

**Evaluation Procedures:**

The twelfth to the fifteenth questions of the study were about evaluation of nutrition educational activities performed in maternal child health (M.C.H.) centres. Such questions were:

- Whether the nutrition officers have instruments to evaluate the impact of nutrition educational activities on the nutritional and health status of pregnant women attending M.C.H. centres?
- Whether there are future plans for improvement of nutrition educational activities performed in M.C.H. centres?
- Is there a nutrition education system responsible for the evaluation of the nutrition educational
programmes performed in M.C.H. centres?

Findings drawn in relation to the above questions revealed, 90% of the nutrition officers had no instruments for evaluation nor plans for future improvement. 10% of the nutrition officers reported, they used to keep records and perform follow-up home visits to some cases of malnutrition among children.

90% of the nutrition officers admitted that nutrition education experts did not participate in any organization or evaluation procedure.

100% of the nutrition officers and nutrition education experts admitted that there was no educational system responsible for evaluation. The Ministry of Health (1988) stated:

"At present there is no mechanism for continuous monitoring to provide a feedback for decision making by the technical and/or administrative decision makers. Evaluation is sporadic and even when evaluation has been done, corrective action indicated by the evaluation findings have not been taken at the right time, thereby making the ultimate purpose of evaluation ineffective."

At present nutrition educational activities
were performed without evaluation of the programmes' plan, materials and process. There was also no evaluation of the impact of the educational activities on the nutritional and health status of mothers and their children attending maternal child health centres. In this particular study, the effect of the face to face counseling approach, using specified concise nutrition messages had been measured using the pre- and post-nutrition tests instrument.

Findings indicated a higher informational content of the experimental group in contrast to the post-test results of the control group, which were geared to the nutrition educational activities offered. This gain of knowledge was noticeable on part I of the tests which was intended to measure the first level of nutrition knowledge and memorizing nutrition terminology. Aim of such knowledge was to create awareness and at the same time discover how much mothers know in the area of food and nutrition.

Part II of the test required testing of attitudes and application-experience. The experimental group, though showed positive attitude and higher score than in the pre-test of the same part, yet the control group was also affected.
be interpreted cautiously because of the lack of means by which the researcher could relate improvement of nutritional status which is the ultimate goals of nutrition education. In other word, the improvement of the experimental group's knowledge and nutritional status - weight gain and the baby's birth weight - could not be attributed to the educational programme alone. Other factors not easy to identify have a role. Failure to demonstrate a change in behaviour concerning meal planning should not negate the value of face to face nutrition counselling oriented messages for the following reasons:

- Time passed between the pre-test and post-test was short and did not allow behavioural change.
- Face to face counselling approach used required that teaching group be very small in number while the experimental group were "60" considered large compared with time they usually spend in the
- Mothers though were very cooperative but they were housewives and had families' obligations. They were always in hurry to go home.
- Mothers were scattered in the province. Some of them reported, they found difficulty in getting transportation. Some reported that transportation fees were high.
- Some respondents' comments were that nutrition messages were brief.

However, the researcher hoped that a little change in cognitive, theoretical knowledge coupled with a positive attitude would eventually help respondent-mothers to acquire new beneficial food habits and beliefs and incorporate them into their daily diets. This assumption was in agreement with what Kathleen Newell et al. (1985) had said: "Nutrition education that attempts to subtly lead people to make desirable dietary changes may be less efficient than methods that provide detailed information as basis for decision-making." The latter approach assumes a highly motivated audience, that is, an audience willing to change dietary practices because they want to improve the nutritional quality of their diets. It is unlikely that all audiences will
study nutrition information and act upon it positively to achieve dietary changes. It appeared that there was a need for the kind of information that will help audiences improve their dietary practices on their own terms - keeping in mind that improvement of nutritional status depends not only on behaviour modification of the respondent but also on other factors, such as behaviour modification of the economic system as well as socio-cultural settings.
PART III

PROCESS OF PROGRAMME DEVELOPMENT

This part is devoted to the process of programme development. The programme was developed on the bases of findings presented in part I and discussed in part II of this chapter. In addition theoretical knowledge from the literature as well as the researcher's experience in teaching were incorporated to formulate the following steps of the process.

- Theoretical concepts from educational philosophy.
- Philosophy of nutrition education M.C.H. centres.
- The Programme Philosophy.
- Psychological aspects of nutrition education.
- Formulation of the learning objectives.
- Screening of the Learning Experiences.
- Rationale for selection of Learning experiences.
- Evaluation
- Lesson - Plans

Theoretical Concepts From Educational Philosophy

One of the primary goals of education is the creation of desirable change that enables individuals to pursue their intellectual interest in their application to successful daily living and pursuit of further scholarship. Posnors and Rudnitsky (1985) said: "Education should encourage the growth of people in the direction of self knowledge, self confidence and it should not force them to grow in ways that are twisted or unnatural to them."
So education should put the recipient in touch with his / her own thought, feelings and experiences to adjust to his / her environment without being forced. Obviously individuals who know who they are in a deep and secure way will be able to lead lives that are meaningful to themselves and probably useful to other people.

Drummond (1975) reported that "The philosophy of Paulo Freire implies a basic stance in education which regards the people being educated as co-workers with teachers who are teaching, and the process as a "dialogue exchange" involving problem posing, reflection and action. His actual method included development of a critical consciousness and literacy training". According to this philosophy the educational programmes have the following characteristics:

1- A joint responsibility in which the educator and the learner teach each other, mediated by the world around them.

2- Matter to be taught is not the private property of the educator but rather a basis for reflection.

3- Learners are co-investigators with the educator.

4- Advocates the problem-posing type of learning experience where the individual is conscious enough of his needs and his problems. This consciousness facilitates the process of
behavioural change. This type of learning involving dialectic exchange is more suitable for adults than the banking type learning or filling up the empty bottle. This is because in nutrition the bottle is already full since food habits and nutritional behaviour are acquired from infancy; our ancestors knew the value of good food and could eat well long before there was a science of nutrition.

5- On the other hand, because food is intimately related to the emotional, psychological well-being of the individual, he has a perceived notion of what good nutrition is and has a set of beliefs, values and preferences which relate to his food habits. Such philosophy which involves discussion might help in modifying food habits which is the ultimate goal of nutrition education.

**Philosophy of Nutrition Educational Programmes in Maternal Child Health Centres**

Programmes of primary health care in general and the M.C.H centres in particular have taken the responsibility for providing all the possible services for promoting the nutritional and health status of mothers and children.

The Food and Agriculture Organization (19/9) reported that women in Africa are regarded as medical
cases. They are particularly vulnerable to adverse nutritional conditions because of their reproductive functions and therefore need specific curative and preventive care. Women are also regarded as social actors responsible for other people's nutritional conditions, usually on the assumption that this role can be strengthened by improving their knowledge and practices through educational measures alone.

Regarding the study of women in the Sudan the researcher discovered that, among the majority, the general picture is that of malnutrition of food, heavy workload and low blood hemoglobin level.

According to this finding, the philosophy of the proposed programme could be evolved from baseline data collected from respondents and adopted to suit respondents needs. This philosophy is based upon Brown's philosophy. Brown (1961) said:

"Education is to fulfill the needs of the learner rather than to fulfill the needs of the institutions where he is learning"

Moreover the philosophy of the educational programme could be guided by the following principles set out by Guthrie (1978):-

1- Nutrition information alone is not enough to cause or enable a person to improve her / his eating habits and her / his nutritional status.

2- The benefit of improved nutrition habits are delayed, according the concept of change now.-
benefits later. Brown (1961) said; "it has been noted repeatedly in general education, there is about a 60 years lag between the demonstration in theory of important concepts or practices and the widespread adoption of the same concepts or practices".

3- It is difficult to offer a sound nutritional alternative to combat the conflicting and often highly emotional claims that immediate benefits can be achieved through the use of specific food or food patterns.

4- The goal is to promote variety in food selection and to be sensitive to the range of acceptable choices associated with ethnic, economic, geographic and age variations in the society. So a balanced diet can be achieved in many ways which vary with the above mentioned factors. In order to be most effective we will need different messages for different groups. We will need to know the patterns of excess and deficiency of each group and the cultural economic and social factors that support these practices. We will need to address ourselves specifically to the most prevalent problems.

Finally, as food behaviour is learned, it is more likely to be influenced by experience rather than by education about the merits of a food. Foods will be eaten only if they are liked. They won't be liked unless they are tasted, and they will only be tasted if
they are available. If we are to succeed, we must continue to come up with many alternative approaches; no one of which by itself can be expected to provide the complete answer. Our methods must be like our message emphasizing variety with the recognition that results come slowly, and what is good in one setting may not be the best in another.

Our method should also resemble our science. We should not promote a food or a class of food without evidence of its contribution to good nutrition and we should not adhere to any method of education unless we have evidence that it brings about desirable habits of food consumption.

It seems that there are many concepts from which nutrition educators may choose one that help to understand nutritional problems presented. The main concept held is the belief that the better informed people are, the more likely they are to make better choices in the selection and preparation of food. Following this concept nutrition education which is needed throughout the human life span and for all sectors of the society, can be inoculated drop by drop when the teachable moment is available.

In 1982 the Society for Nutrition Education (SNE), noted the following:

"Concepts for good nutrition education are ideas
around which the content of nutrition education curricula can be built, and the first step in the curriculum development process is the identification of concepts to be included. The (SNE) food and nutrition conceptual frame work is intended to serve as the universe from which nutrition educators may select a part or all in developing curricula. Since concepts are mental images or ideas abstracted from objects, procedures or relationship, they do not by themselves serve well as organizers for operational, teaching and learning plans.

The formulation of objectives, the next step in the curriculum development process, is the critical link between the conceptual framework and the teaching and learning plans. Objectives are useful organizers for curricula, specify what should be taught, and define what learning is to be achieved. The (SNE) believes that it is imperative that nutrition educators be involved in the process of translation of concepts to objectives as well as the selection of concepts to be used whenever curriculum materials of teaching and learning plans are being developed.

However, programmes of nutrition education for adult vary from the most segmented to a superficial approach to small problems of daily living. Brown (1961) described adult education in the United States
of America and listed the following characteristics which can be adopted to this particular programme.

1- All programmes were non-credit.

2- Each programme tended to have a small number of discussion groups.

3- Much emphasis had been placed upon the humanities and the subject of values.

4- Care had been taken to provide experiences which were not considerably different from those encountered in daily life.

5- Difficulties had been encountered in objective evaluation.

Generally the philosophy lying behind these programmes provided an opportunity for adults to gather, think more clearly and to talk to each other about a particular problem, to share in discussion more easily and to enjoy the learning experience.

Hansen (1982) said: "The American educators focus their attention and effort in developing learners' ability to think, interpret, to analyse, to evaluate and to create". In agreement Seyer (1984) said: "90.0% of the professional educators in U.S.A. agreed that philosophy and technique of education that improve and enhance thinking should be a major priority in educational planning for the coming years".

The anticipation of such a philosophy is required in this complex world. Nickerson, (1984) reported that all of us know how to think without being taught. The problem is to get us to do so with some consistency".
The Programme Philosophy

The term philosophy is used here to illustrate the prospects and predictions that are involved in teaching nutrition.

This programme is built from a group of connected and integrated elements. The first element is the specific objectives to which the study was directed.

The second element is building the framework of the programme which comprises a group of concepts. These concepts are connected with identified goals. From these concepts many questions arouse to create relationships and associations. These relationships formulate the knowledge body which clarifies the way to goal achievement.

The third element is formulation of techniques to measure the impact of the educational effort, not only on the improvement of nutritional knowledge but on the improvement and appreciation of anthropometric measurements during pregnancy.

Generally the philosophy of the programme is based on the belief that through informed good will and sustained cooperation effort by nutrition educators and health workers in M.C.H. centres, mutation of nutrition can be achieved.
Costa (1984) said: "metacognition is our ability to plan a strategy for producing what information is needed, to be conscious of our own steps and strategies during the act of problem solving and to reflect and to evaluate the productivity of our thinking".

The philosophy of the programme is also based on the fact that nutrition comes to the fore in times of crisis, coupled with the fact that it is concerned with the issues that touch real life and can implement practical activities related to daily living experiences. Moreover since women are actively and mainly concerned with food selection, preparation and distribution, then any women's gathering would be an ideal situation to blend theoretical nutrition knowledge with their previous practical experience and beliefs and build on their critical awareness, for self learning and problem solving.

On the bases of this philosophy, the researcher believed that nutrition education can be acquired outside formal schooling.

This philosophy will help the national government in meeting the goal of providing adult and health education.

Moreover, integration of nutrition educational activities with health services may in future change the relationship between health providers and the
respondents of the formal health delivery system, so that the respondents will be more responsible and less dependent on experts. Especially if we know that UNICEF (1987) now advocates that "mothers be actively involved in weighing their children and charting their growth". Involvement of parents in growth monitoring, in developmental education, in formulating new weaning food, in being central figures in primary health care programmes is an innovation in the health delivery system.

Moreover, home visits carried out by the researcher were of great value in building a better liaison and nutritional awareness among women.

Also, the idea behind including different populations was to formulate and understand the views of the programme planners (nutrition experts), implementers (nutrition officers) and beneficiary respondents (i.e., mothers attending W.C.H. centres).

This understanding can help the researcher to identify the needed nutrition knowledge to be included in the programme.

Psychological Aspects of Nutrition Education

When developing a nutrition educational programme various factors must be taken into consideration if the programme is to be theoretically sound and
practically viable. Factors such as food habits, available food crops, prevalent nutritional deficiencies, psycho-social and economical factors involved in changing cultural habits related to food as well as psychology of the learner and effective techniques for motivation.

Burton (1952) said:
"The process of learning is doing, acting, understanding and experiencing. Experience implies a change in behaviour and this in turn, leads to changed habits, values, interpretations, attitudes and skills, all of which are achieved by the learner, through his own activity."

This old definition emphasizes, the Chinese proverb which says: I learn by doing. Obviously nutrition education as an applied science and particularly when applied to adults with their past experience, offers opportunities for intellectual and psychological development. In such case the statements about the principles of learning made by Fleming (1957) are needed in order to affect the acquisition of knowledge and its application. These principles are:

1. Learning takes place more readily when emphasis is placed on the individual.

2. Learning tends to occur as emphasis is placed on the learner's perception of the task to be accomplished.

3. Learning is facilitated as emphasis is placed on human relations factors.
... attitudes should be considered and be incorporated into the teaching-learning process and evaluation techniques that measure the pace of change due to the impact of learning experience and not change that occurs gradually due to process of maturation.

Obviously learning takes place when the individual is physiologically and psychologically ready. Physiological readiness depends upon the learner's maturation while psychological readiness depends upon the purpose selected or accepted by the learner which is always governed by felt needs. Each individual differs from another. Therefore this difference among learners and application of principles of learning and motivation are some of the important factors that control and condition learning. Giff et al (1972) reviewed three important factors which affect nutrition behaviour change through education. Such factors are:

1- Effect of knowledge on practice.
2- Motivation.
3- Values, attitudes and beliefs.
nutritional knowledge level and nutritional status. Sanjur et al. (1970) found that formal educational level of the mother was more correlated with adequacy of infant feeding practices than other sociocultural variables including family’s income.

2- In the motivational theories formulated by Maslow (1943) and Resonstock, (1960) learner’s motivation was related to compliance with suggested modification in health-related behaviour. They laid down principles related to the individual’s response to health and nutrition education. Such principles involved the following. The degree to which the respondent sees the consequence of the present behaviour as having personal significance to his or her situation. Benefit of changing food habits is usually deterie i.e. benefits will be seen later in the future. Maslow (1943) had provided a theoretical framework for analysing human motivation which can help the nutrition educator. Maslow said: Man is a perpetually wanting animal. But according to Maslaw the
physiological needs, i.e. hunger and thirst take precedence over all other desires. Although the desire for health is always ultimately connected with survival particularly during pregnancy period, yet the health motive alone is not effective in changing nutritional behaviour, since the result of poor eating practices are not usually clear and immediate. Therefore learners must be taught to find learning within themselves.

Calicenó's (1979) research studies demonstrated that attitudes influence both food and nutrition knowledge as well as food habits. Obviously every grown up individual has specific attitudes towards food, taste, time and style of eating, mode of cooking and quantity and type of food that the rich or the poor or the infant or pregnant and lactating mothers should eat. This attitude is cultivated subconsciously from an early stage of life in the home and reinforced by social environment. So any change of attitudes is likely to face rejection. To overcome this challenge it is very important to consider seriously how attitudes can be modified when needed. Colinder et al (1978) reported that, "all educators stressed that their major concern was motivating clients to use the abundant nutrition information now
available. Their concern was that good nutrition should be understood as the basis for more enjoyable living. They also viewed themselves as the resource for sound food and nutrition information.

Closely linked with the question of attitudes are food habits. Every family and every society has its own style of life which includes specific habit related to the processing, presentation, preparation and mode of consuming food. The family transmits its food habits to the younger generation and consequently people form habits regarding the manner of eating, time and frequency of eating, and variety of dishes expected at each meal.

Some food habits are not always nutritionally sound and therefore need to be changed or modified through education.

According to Read, (1955) the question to be asked by the nutrition educator is "how do food habits change?". Not "how do you change food habits?"

So investigation into factors which influence this change may provide helpful clues for nutrition educators who attempt to improve food
point of view, to ensure reasonable success in nutrition education.

Formulation of the Learning Objectives:

Identifying learner objectives is critical to the design and development of a comprehensive nutrition educational programme. The objectives will have some implications for developing needs assessment instruments, curriculum focus and baseline data for evaluation of programme effects.

According to Tyler (1959) and Brown (1953), rationale of curriculum development involved four major tasks, that were:

(1) Formulation of educational goals.
(2) Selection of learning experiences by which learners may attain these goals.
(3) Effective and efficient organization of these learning experiences.
(4) Evaluation of the extent to which the goals have
status, health and nutritional status of pregnant women, in addition to preliminary investigation that involved nutrition education experts and nutrition officers. The main purpose of the investigation was to, derive primary data for answering the question of what a nutrition educator in a health centre needs to know and what to do in order to alleviate the problem of malnutrition facing mothers and children.

Prior to that investigation consultation of local literature revealed a lack of systematic study or recorded data which could help in building the nutrition educational programme.

The investigation revealed a list of learning needs, knowledge and abilities inferred from case analyses carried out of malnutrition among children under five years old and cases of high maternal mortality rate.

Dave (1974) gave a full description for classifying objectives of nutrition education, starting by emphasizing that a programme of nutrition education should essentially be problem centred. The objectives must be stated at different levels. There should be overall national objectives regarding food, nutrition and health. This calls for policy planning that emerges from health and agriculture ministries. From national goals, definite educational objectives can be
developed. **Educational objectives may be stage-wise.** That is objectives for primary education, secondary, adult education etc. These are also in a way broad in scope and should therefore be further broken down into **curricular and instructional objectives.** The curriculum should be developed according to these specific objectives. They should also be used for developing instructional materials and techniques as well as for evaluation procedures. These objectives can be still further specified into unit-wise and activity-wise objectives which become guiding stars for teaching different units and for organizing a variety of curricular and co-curricular activities.

It should be ensured that all these objectives are derived from needs of the individuals and society, important problems existing in the field of nutrition and psychological, sociological and anthropological factors governing the process of teaching and learning. When the objectives are being developed, it should be ascertained that they have an appropriate **taxonomic structure** and are well balanced within the terms of the cognitive, affective and psycho-motor development of the learner.

Newfield and Bell (1982) said: "since the early 1960's-educators have moved towards a technology for curriculum and instructional design based on the description of the behavior learning outcomes."
According to Sandura (1977) behaviour objectives are a statement of what the learner must be able to do after learning and knowledge is an underlying construct that reflects a potential for behaviour. In this sense statements of behaviour outcomes are statements of ends not means.

Greeno (1976) encouraged the stating of objectives that focus on the psychological processes and structures that are sufficient to produce the needed behaviours. Such objectives were labelled by Newfield and Bell (1982) "as structural procedural objectives; are descriptions of intended outcomes of instructions made in the form of statement of knowledge structure and cognitive processes." An example of such structural procedural objectives was given by Newfield and Bell (1982) "The student will be able to select foods to support a balanced diet." Obviously such an objective will be attained as a result of the cognitive process which was defined by these researchers as "a set of mental operations whose performance leads to some end." This means it is the learning experience offered by an educational programme.

However from the above discussion and review it is clear that there are various approaches to describe the educational results. According to Posner and Rudnitsky (1986) goals found in a course rationales should be
educational goals that attributes or characteristics of the well educated person rather than the specific skills or knowledge that constitute that education. learner, the society and the recommendations of subject matter experts. The following guidelines for stating appropriate educational objectives were adapted from Johnson (1972).

1- Educational goals should describe the desired product; what units should be offered; what instructional procedures should be used and what environmental conditions should be maintained to achieve the results. This means that the statement of the goal should describe the consequences of such practices and experience.

2- The scope of educational goal is an important consideration. Goals should not be so broad that they give purpose and justification to anything and everything and thus mean nothing. A statement such as "a person needs to be well educated in the area of nutrition" provides no guidance or meaningful justification for any set of learning. On the other hand goals should not be narrow identified learning outcomes. A statement such as "a person should know the name of nutrients" is too restrictive to serve as a justification; it is more appropriately an identified learning outcome.
Educational goals should be stated as desirable characteristics attributable to learning. Educational institutions may well be expected to achieve certain social goals, such as reduction of dropout rate and nutritional supplementation; but these are not educational goals because they are not achievable through learning.

However, in considering what distinguishes educational goals from other types of goals, it is useful to consider the distinctions made by Zais. Zais (1976) said: "Aims are described as life outcome, targets removed from the school situation to such an extent that their achievement is determinable only in that part of life. While goals refer to 'school outcomes' which are long range and reflect schooling in general rather than specific levels of school objectives are viewed as a specific outcome of classroom instructions."

To summarize, the actual outcomes of learning are those things which are learned by respondents during the learning experience. Those actual identified learning outcomes can be classified into: learning outcomes that are intended and are important and those that are not intended and could be side effects. The assessment of intended and unintended outcomes form the basis of evaluation. Therefore to facilitate this process, screening of objectives was performed.

**Screening of Learning Objectives**

After formulation of the objectives on the basis
of Tyler's form, they were screened. Those which stand high in terms of value implied in the philosophy of the programme and the facilities available and the base line data collected, were identified. Those that were inconsistent with each other or contradictory to the philosophy of the learning process were eliminated. Through this process of screening the objectives selected for this nutritional educational programme were arranged according to cognitive, affective and psychomotor perceptions skills:-

1- To provide respondents with basic nutrition knowledge.

2- To incorporate nutrition educational activities into other existing activities performed in Khartoum Model Clinic.

3- To provide learning activities to help respondents relate food and nutrients to health and acquisition of optimum weight gain during pregnancy.

4- To help the respondents to select foods to support balanced diets.

However, the learning outcome that is the desired product from learning experience will be stated with each teaching unit when describing the programme content.

Rationale for Selection of Learning Experience:
Redman (1983) said: "Teaching is an interactive process between a teacher..."
and one or more learners."

The teaching-learning process is a complex entity composed of various interrelated parts. These parts were stated by Redman (1968) as follows:

1- Identifying the need of the learner.
2- Determining the motivation of the learner.
3- Establishing the objectives of the learner.
4- Evaluation in terms of desired learning or change in behaviour.

To identify the needs of the learner baseline data collected will be considered.

Motivation of the learner emerges from the fact that the programme will be held in a health centre where the respondents receive health services, family planning programme and child care including growth monitoring. The relationship between these activities is well established in literature.

Rahemomun et al (1976) reported that, "In the world around, still birth and neonatal death rates and low birth weights are associated with nutritional status and dietary intake along a socio-economic gradient." So the general goal of the M.C.H. centres will be to assist in reducing the incidence of maternal and infant death and diseases by providing health and nutrition education to mothers attending. The researcher surveyed activities normally performed in
M.C.H. centres and found that nutrition educational activities could be incorporated into seven components of the M.C.H. centres, namely:

1- Growth monitoring and anthropometric measurements; for women during pregnancy and for their children.
2- Vaccination for women and children.
3- Family planning counselling and lessons.
4- Medical check up, prenatal care and consultation.
5- Supplementary feeding.
6- Self-selected activities e.g the 16-October World Food Day, The World Mother's Day, the International Women's Day and the International Child Day.
7- Outlet display of posters, pamphlets or handouts.

In addition to these components, plans for incidental programmes such as selection of educational workshops specific to the needs of respondents can be considered.

In this particular study a nutritional counselling pamphlet was designed. It is made up of seven concise nutrition messages organized by the four food groups concept. The pamphlet was designed to fit into the seven components. (See copy of the pamphlet in appendix VII) using the learner success oriented education approach. This approach had been used by Shortridge (1974). It was based on two elements :-

A- Learner focused objectives.
B- Learner focused instruction.

A- By learner focused objectives it was meant that all objectives were stated in learner terms and begin with "The learner". Such a beginning solidified the learner-focus in each objective. When operational statements were added the objective read as follows: "The learner plans a day's selection of foods to meet the four food groups system criteria." In order to master this effective objective, it was broken down into the following enroute objectives:

1- The learner classified a variety of foods into the four food groups.

2- The learner stated the number of servings recommended from each of the four food groups.

3- Learner selected approximate serving sizes for a variety of food within each of the four food groups.

4- The learner planned a day's selection of food to meet the four food groups criteria.

These objectives went beyond learning for its own sake and emphasized performance and action.

B- Learner focused instruction: this system was based on three principles and with the help of these principles instructional activities were planned and executed until success was achieved. These
principles were:

1- People learn best when supplied with the relevant facts, information and procedure they will use. This principle emphasizes that information which is necessary to mastery of the skill should be presented.

2- People learned best when given the opportunity to practise the skills which are to be learned. Practice should be appropriate to the objectives and frequent enough to assure mastery. This means the learner practises selecting amounts of food that approximate a nutrition serving within each food group. It does not mean that the learners practise wise preparation of their food.

3- People learn faster when supplied feed-back as to how well they are progressing. This principle emphasizes the importance of feed-back as a motivational impact to the learner and the teacher.

For the learner, frequent feed back helps her/him to avoid errors and speed up the process of learning. For the teacher satisfaction is achieved when the learner is successful.

Guided by this system of learner success oriented education the researcher was able to approach women in
needs of the respondents, the nutritional problems existing as well as psychological, sociological and anthropological factors governing the process of learning, make the possibility of achieving them expected. Moreover the programme is entirely goal directed and problem centred. For this purpose it may be necessary to work out specifications for each objective and use them as unitwise and activitywise objectives.

According to Dave (1974) academic studies, use of schools and health centre meals, supplementary food programmes as well as home and school gardens and other activities connected with food, all can be used as a learning experience. Some general units were suggested by Dave (1974) as follows:

(i) Nutrition and nutritional values of locally available foods.
(ii) Food, health, population and cost factor.
(iii) Dietary habits of the family.
(iv) Food supply, losses, preparation, preservation and consumption.
(v) Nutrition and food policy.

The location of such units and the time allocated to them among different sectors of people must be decided in accordance with local situations after thorough analysis of the baseline data collected in the planning phase.
As nutrition education is expected to influence the attitudes and habits of the learner, it is desirable to construct a programmed plan which has a built in quality, of periodical reinforcement of learning over a long period of time extending over several years. To fulfil this purpose Dave (1974) suggested, that "a variety of co-curricular activities must form an integral part of a nutrition educational curriculum". A large number of co-curricular activities should be organized from time to time not only at the class and school level, but also at community level, in order to generate an educational climate. The co-curricular activities may include exhibitions, preparation of posters, talks and debates, display of newspaper cuttings and other materials and surveys of families, special nutrition education group, radio, television and film programmes. These activities should be planned in advance and there should be a planned involvement of students, teachers, parents, opinion leader and other community leaders. Over and above these planned activities of curricular and co-curricular nature there should be a number of incidental organized programmes to produce non-formal learning. These activities may be planned for community at large or for a group as literacy adult classes in a village club or a clinic day care centre. The content of such activities includes persuasive
messages. Johanna (1976) reported that, "The greatest need for an illiterate, regarding nutrition is for practical nutrition advice in straightforward jargon-free language which can be put to use to help solve immediate problems. Topics such as: (1) The promotion of breast feeding; (2) The use of supplementary and home-made weaning foods; (3) The use of locally inexpensive food to complement cereal-based diets of older children and adults; (4) Education on the relationship between the child's diet and his growth progress." Johanna, (1976) added that, "At least four governmental funded persons are necessary to deal with nutrition education; the teacher; agriculture extension worker; Health auxiliary and Community workers. All need incentive money, status and training."

Thus these instructional contents coupled with the six universal messages previously mentioned in Chapter II can formulate the nutrition educational lessons' content.

Methods of introducing nutrition education are various since the process of nutrition education is not just a question of giving information to be memorized (i.e. cognitive domain) but it demands active participation i.e. affective and psychomotor objectives to be achieved through efforts of communication and learning by doing. This means in teaching nutrition practical and demonstration sessions are more important than theoretical lectures. Instead methods
of teaching such as those involving group discussion and problem solving can be used. According to Dowald and Wallace (1983) teaching that promote the development of problem solving ability includes: "Simulation" values clarification, case studies, games, debates, projects and brain storming.

Many researchers have attempted to list the stages involved in problem solving. For example Dowald and Wallace (1983) listed the the following stages: -

1- Identifying the problem.
2- Interpreting the problem.
3- Listing the alternative choices.
4- Selecting the best solution.
5- Implementing the decision.
6- Evaluating the sequences.

These steps, though they identified the way to solve a problem, can not guarantee to solve it unless there are a clear objectives.

According to Posner and Rudinitsky (1984), whether students are learning concepts, propositions or cognitive or psychomotor skills, many educational psychologists agreed that the following principles and strategies were valid: -

Principles
1- In order to learn something the learner must first attend to the task.

Strategies
1- Gain and control the learner's attention.
1- Relating a new task to what the learner already has experienced or is experiencing facilitates learning.

2- Determine what the learner already knows and teach accordingly.

3- Appropriately scheduled practice in increasingly varied contexts increases retention, transfer and understanding.

4- Provide feedback or knowledge results enables the learner to adjust his or her behaviour.

4- Provide feedback during and after learning whenever possible.

If these principles and strategies are considered in selection of the learning experiences, it would be possible to achieve the educational objective goals of acceptance of nutrition knowledge provided, and modify food behaviour where and when necessary and ultimately improve nutritional status. However Sevenbuysen, (1978) stated that, "acceptance of nutrition ideas can be brought about by demonstration of improved horticulture or animal husbandry practice and through employing local people, trained to a minimal level who inspire trust and are able to propose changes." An approach to gain acceptance of ideas in any communication programme had been described by Freire (1970) in which the educator develops among the population the conviction that they can act to improve
their situation themselves and do not always have to rely on outside help. Moreover Sevenhuysen (1978) added that "nutrition education can contribute effectively to the process of development if these basic principles are incorporated:-(i) The nutritional advice is practical, short and relevant to the local problem and felt needs (ii) The message is part of the advice given by many technical field workers, such as agricultural agents, health and community development workers - who should be informed of the nutritional implication of their work. (iii) The programme is funded or linked with an investment programme."

Another approach is described by Wishik (1976). "The concept of "positive deviants". Population groups are surveyed to determine the individuals or families who demonstrate positive habits. These persons, labelled "positive deviants", are studied anthropologically to determine practices related to food sources, preparation and consumption. Using these data, the educator then designs a nutritional promotion for others in the community on the premise that current positive practices would probably be socially and culturally acceptable and would be likely accepted by others in the community. This approach builds on the beneficial aspects in tradition, culture and environment. However, nutrition educators in their endeavour to develop curricula have many models and
approaches. One of these is called the "Rational empirical design" described by Griffen (1974) and "involves the use of stated behavioural objectives, activities to meet the objectives and evaluation to determine the discrepancy between planned and achieved outcomes." Another strategy described by Griffen (1974) is called the "travel metaphor method," in which there is a body of knowledge, facts, concepts, values and beliefs that are known and understood by the educator. It is the educator's responsibility to lead the learner through this body of knowledge and beliefs and to point out what is considered important. The educator is thus a travel guide whose job is to provide the student with a set of stimuli and the chance to react positively to the learning process.

According to Caliendo (1979), persuasive communications are the basis of successful nutrition education efforts. They can be analysed in terms of three components. The message, the communicator and the audience. According to Caliendo (1979) persuasive messages will be accepted if they promise to bring social approval. The message should not be entirely one sided, but should make an attempt to explain possible counter-arguments to the suggested change. Much of the message content depend on what the audience already know; how they evaluate their present dietary habits and nutritional status, what their present
eating habits actually are, how much they desire to know and the changes they are willing or can afford to make. The message should be presented in the context that choosing food for improved health is not an end in itself but rather, a means to an end.

However, six universal messages that are of proved validity had been described in Chapter II.

Caliendo (1979) sets out questions the answers to which help in the formulation of nutrition information. Examples of such questions are as follows: what is an appropriate diet? How can this be achieved? Who is especially vulnerable to malnutrition? How can the special needs be met? What is food safety? How can food be prepared and served safely? Where can reliable sources of nutrition information be found?

In addition to the answers to these questions, nutrition information can be drawn from concepts set out by the Interagency Committee on Nutrition Education. These concepts were listed by Caliendo, (1979) as follows:

1- Nutrition is the food you eat and how the body uses it. We eat food to live, to grow, to keep healthy and to get energy for work and play.

2- Food is made up of different nutrients needed for growth and health.
(a) All nutrients needed by the body are available through food.

(b) Many kinds and combinations of food can lead to a well balanced diet.

(c) No food by itself has all the nutrients needed for full growth and health.

(d) Each nutrient has specific use in the body.

(e) Most nutrients do their best work in the body when teamed with the other nutrients.

3- All persons, throughout life, have need for the same nutrients but in varying amounts

(a) The amount of nutrients needed is influenced by age, sex, size, activity and the state of health.

(b) Suggestions for the kinds and amounts of food needed are made by trained scientists.

4- The way food is handled influences the amount of nutrients in food, its safety, acceptance and taste. Handling means everything that happens to food while it is being grown, processed, stored and prepared for eating.

Having given a full description of the learning experience, one question remains which requires an answer. Who communicates the nutrition message, in other words, who is the nutrition educator? and what is his role?
Caliendo (1979) reported that "almost everyone communicates ideas about food and diets. But the most persuasive influence is a communicator who has great credibility, is sincerely knowledgeable and well informed about the values and culture of the community, specially in traditional society where in children and in food preparation the old person teaches the young. If the old find themselves the subject of teaching from the young and if the teaching style is perceived to be authoritarian or haughty the subject matter and the young educator may be rejected, no matter how beneficial the teaching".

To solve this cultural stumbling block Caliendo (1979) suggested that local leaders can be selected and trained in the fundamentals of nutrition information. Also children can be effective communicators by introducing to their families attitudes learned at schools. Caliendo (1979) defined the role of nutrition educator as to help people and appreciate their values and understand the opinions of the community leaders.

According to Earth格局 (1982), the nutrition educators' role requires that nutrition educators educate themselves especially with respect to what factors determine access to food in a given situation, how factors are interrelated and which ones can be
subjected to change. Nutrition educators should not limit their educational messages to information about the cause of nutritional problems without giving attention to the setting in which they occur. They also must expand the number and types of target group for nutrition education. In particular, they must identify the people who make fundamental decisions in the economic and political spheres.

As with regard to the question about to whom nutrition education be addressed, Caliendo (1979) illustrated various levels of nutrition education as shown in the following figure.

Figure 7: Audience for nutrition education—adopted from Caliendo (1979).

The most important member is the individual who is responsible for purchasing food supplies for the family.
Levin (1943) had termed this individual the "gate keeper". Lambert (1975) reported that, "many attempts to introduce nutrition have failed because they did not include such audience participation. People are more likely to change their behaviour if they make some sort of personal commitment to change."

Still another approach to introducing nutrition involved the use of mass media. Manoff (1975) referred to the mass media as "a natural resource which could be used for purposes of public welfare and national development. Assuming appropriate messages, the mass media can reach out to all the target audience on a preventive basis, with nutrition education and motivation in a continuing programme, limited in its content, but total in its impact".

According to Rogers (1969) mass media were able to create a generally favourable mental set towards change but were seldom able to change specific attitudes towards new ideas, a task better accomplished by interpersonal communication channels. This weakness could be attributed to the fact that nutrition education efforts attempt to increase knowledge as well as to modify behaviour and change time-honoured practices and tradition.

Rasmussen (1977) reported "the central weakness of the face-to-face approach to nutrition education - its
limited out reach and impact - stimulated educators to investigate the possibility of mass-media. Similarly, the realization that mass media were unable to provide needed individualized reinforcement promoted educators to experiment with techniques that combined interpersonal and mass media approaches."

However no matter how sophisticated the approach used its success depends ultimately on the human factor.

The success or failure of a programme will depend on the correct evaluation planning of the existing situation.

To this point the theoretical aspect of the programme development has been concerned with setting up a focus justifiable and coherent programme. But information about the effectiveness of such a programme is needed in order to make a decision about its implementation. Such information and subsequent decision-making comprise an evaluation procedure aimed at improvement of the programme.
Evaluation

Barta et al. (1985) reported that, in recent years, nutrition educators have established the need for including evaluation as an integral component of nutrition educational programmes.

Evaluation was defined by Sahn and Robert (1981) as "a concept not a discipline within the context of programme planning and intervention. Evaluation involves numerous activities, most of which require the measurement and comparison of programme activities and outcomes to previous measures of the same phenomenon or some specified standard in order to analyse information for decision alternatives and, hence a course of action".

In the literature, four adjectives were commonly associated with evaluation: impact, process, summative and formative. According to Sahn and Robert (1981), process and impact focus on one of the other end of the input/output stream, while formative and summative focus on the purpose of the evaluation.

Evaluation can be used for many types of decisions. For instance Cronbach (1963) identified three uses for evaluation as follows:

a) Course improvement decisions;

b) Decisions about individual student respondent;

d) Administrative regulation.
Evaluation for course improvement involves gathering information that will be useful in deciding which aspect of a course can and should be improved.

Evaluation aimed at decisions about the student or respondents consists of gathering information to be used in assessing students' or respondents' needs in the grading, grouping or selection of individual students.

Evaluation for administrative regulation is required toward assessing the merit of schools' curricula, materials, teachers and so forth."

Cronbach, (1963) argued that using evaluation for programme improvement contributes more toward improving education than do the other uses of evaluation.

According to Dave (1974), an effective programme of educational evaluation should include the following:-

a) Curriculum evaluation which evaluates curriculum plans, material and process that are the antecedent of learning, and

b) Pupil evaluation which is designed to appraise the actual outcome that represents the consequence of learning.
Generally, three types of curriculum evaluation are necessary. These are presage, formative and summarizing evaluation.

Presage evaluation of existing curriculum instructional material and method, provides specific information regarding the existing situation and the kind of reform needed. Formative evaluation is needed at the time of designing new curriculum, content, media and methods. Dave (1974) defined it as:

"an improvement oriented evaluation carried out during the process of curriculum development. Each unit of study or activity is tried out and evaluated at the formative stage of the curriculum and improved in the light of evaluation results".

For this purpose it is necessary to have a few experimental groups of students where the new curriculum can be tried out, improved and thus evolved on scientific lines. The overall effect of the new tried curriculum and instruction, time required and various other aspects regarding the full curriculum can be assessed through a summarizing evaluation before the programme is launched on a mass scale.

On the other hand, respondents' evaluation is for the purpose of judging the success of the programme and for the purpose of improving achievement during the process of learning. Because of this dual purpose, diagnostic and mastery tests are needed in order to
evaluate the three educational outcomes i.e. cognitive, affective and psycho-motor domains. For cognitive outcomes written tests and oral examination are appropriate. For affective and psycho-motor outcome, techniques like observation, interview and rating scale will be necessary. Dave (1974) reported that, "in the ultimate analysis a good programme of evaluation results in a continuous improvement of individual's nutritional status and modification of food habits where needed. To accomplish this every individual is required to make a quick mental evaluation of every meal that has been eaten, against the nutritional value of each food, the requirement of the body and the cost factor. This type of self evaluation should be a habit throughout one's life". This type of habit can be inculcated through continuous education from primary school and through frequent talks among family members about the kind of food they eat, the way in which it is cooked, availability of new food in the market and the kind of change that the family had been able to bring about in its food behaviour."

Likewise participatory evaluation can be carried out within the health centre where supplementary foods are provided or within the school where meals are offered. Students, respondents, teachers and health workers can praise the nutritional values of the meals.
Moreover both Wolf (1975) and Zeitlin (1977) discussed the evaluation of nutrition education and agreed on the measurement of several characteristics. Zeitlin's KAB "Knowledge Attitudes, and Behaviour" model and Wolf's statement such as: "a nutrition education programme will often seek to have learners acquire knowledge, be able to use knowledge...act in specific ways in various situations, acquire particular habits and attitudes towards food and diets" are remarkably similar in content. Wolf (1975) added, "measures which may be employed by evaluators to determine whether objective attainment has been achieved, e.g. written tests, oral questionnaires and observations. Each participant is asked to reply to a series of questions which cover only a small portion of the material covered during project lessons. When individual tests questions are aggregated, they cover all material presented by the nutrition education curriculum".

Zeitlin (1977) expanded her model to include measurement of an additional variable, i.e. improvement of nutritional status (INS), one which ought to be paramount in the evaluation of any nutrition programme. Zeitlin (1977) stated that "If our education is effective, the results will be reflected in improved nutrition status.... No matter how impressive our successes are in changing reported knowledge, attitudes and behaviour...if these changes do not result in improvements in child growth, in mortality rate or in other physiological indicator...we fail to achieve our final objective."
It can be concluded that for nutrition education, achieving educational objectives is not sufficient, there must be improvement in nutritional status. According to Sahn and Robert (1981) "measurement of nutritional status relies upon several measures which are suggestive of the whole; and the relationship between measures is often uncertain. Four types of measures can be used for impact evaluation namely - Anthropometric measure, clinical, dietary and biochemical measures".

However, these measures in general possess certain characteristics, that were summarized by Deniston (1981) as the following: objectivity, coverage, directness, completeness and precision. Each class of impact measures varies in terms of these characteristics.

Sahn and Robert (1981) stated: "The theory of a continuum which described the characteristic of directness is best examined by the following: The output of a nutrition education program is that women were given classroom instruction related to food purchasing and menu preparation in order to gain knowledge and change behaviour. The purpose was to improve nutritional status. Process evaluation measured documents, whether or not the changes occurred, or if they did, how frequently. This fell toward the least direct end of the continuum. Another process measured, whether participants were able to reiterate
nutrition information or purchasing hints, is a more direct process measure."

The following figure (9) shows that, as we continue toward the "more direct" end of the continuum, we begin to examine process issues such as behavioural change in purchasing and preparation. It is not, however, until we look at the change in dietary intake, that we cross the boundary between impact (nutritional status measure) and process. Dietary data represent the least direct of the impact measures. Anthropometric, clinical and biochemical represent more direct types of measures. It has been difficult to evaluate the effectiveness of the educational programme and particularly its impact on behaviour.

Measurement of nutritional status relies upon several different measures and the relationship between them is often uncertain. If for example a respondent had a low haematoctrit reading (biochemical measure), this could be suggestive of poor nutritional status and inadequate dietary intake of iron. However, no direct relationship had been found between haematoctrit and dietary measures of iron status since the poor iron status could be due to a variety of causes unrelated to the amount of iron in the diet.
Figure 3

Directives of Measures of Nutrition Educational Programmes (adapted from Saan and Rothen 1987)

- Most Direct
- Least Direct

- Direct Impact measures
- Process measures
- Memorization of lessons
- Purchasing dietary materials
- Dietary Ancillary activities
- Class held
o.g. worm infestation, malaria attack or phytate blockage. Therefore, any attempt to correct nutritional problems requires linking many variables under the umbrella of culture and social science as well as assessing technological and environment impact. Anthropometric data is a more direct measure as it quantifies the improvement in nutritional status as determined by growth in case of children and gain of weight during pregnancy.


LESSON PLANS

Data collected from the various sources, coupled with evidence from current literature reflects a concern for implementing the educational programme in the form of these lessons - that had been implemented in Khartoum Model Clinic.

To begin with the actual planning for the lessons involved many questions that required answers and many decisions that needed to be made.

1- A question such as what were the objectives of the programme required decisions to be made about the general aim which the lessons planner was to pursue as well as a decision about the specific objective of instruction.

2- The question of what nutrition information was needed required a decision to be made about the major areas or subject matter to be selected as well as specific content covered in each, depending on the findings of baseline data.

3- The question of how the respondents would receive the information required a decision to be made about the type of learning experience with which to implement both the content and understanding of other related concepts such as health and socioeconomic variables.

4- The question of how the programme should be evaluated,
required decisions regarding how to measure what respondents were learning as well as the effectiveness of the programme in attaining the desired ends, i.e. optimum nutritional and health status.

Finally a decision was needed regarding the overall pattern of the programme. Moreover, drawbacks or barriers to conducting nutrition education in M.C.H. Centres, should generally be investigated.

Answers to the above question formed the guidelines for describing the nutrition counselling lessons implemented. The duration of these lessons extended for three months starting after the collection of questionnaire I, including the pre-test section.

However, results obtained from analysis of baseline data indicated multiple nutritional and health problems as well as harmful food habits and other socio-cultural problems.

Some of these problems were emphasized and identified as of major concern. Such problems were:

- lack of knowledge in the area of nutrient sources such as iron and calcium;
- lack of awareness of the importance of weight gain during pregnancy;
- lack of awareness among women of the fact that infectious
diseases such as anaemia, malaria and worm infestation—in addition to their effect on health—also cause food and nutrient wastage and lack of awareness of the importance of breast feeding as a strategy for child-survival and child spacing as well as economical profit.

One consistent aspect of these problems was the complex association and relationship between certain demographic variables such as age, income, food intake, health, weight gain, and low birth weight. Because of this complexity it was very difficult to establish any relationship between anthropometric measurement, i.e., weight gain, and

a) Theoretical nutrition knowledge.

b) Food habits and nutrition knowledge. In other words it was not possible to say that respondents who gained nutrition knowledge have better food habits than the others who have not. For example both groups used to eat strange things and both did not know the nutritional requirements for themselves and for their foetus. Food avoidance among the two groups was dominated by fear of having big babies which they thought would make labour difficult and/or necessitate Caesarean section. Both groups showed poor intake of the milk and milk products group as well as fruits and vegetables group.
Lack of nutrition knowledge was obvious in responses to the pre-nutrition test. The presence of these problems made the process of objective formulation less difficult.

I. Instructional Objectives were:

- Help the respondent to know food sources of iron, calcium and protein.
- Help respondents understand how to apply nutrition knowledge to make balanced meal selection.
- Make learner understand importance of anthropometric measurements, for herself and for her children.
- Make learner understand the importance of breast-feeding, gradual weaning and properly planned supplementary feeding practices.

II. Topics of Nutrition Knowledge Covered Were:

1. Basic concepts and terminology of nutrition such as meaning of nutrition and what are the six important nutrients.

2. Basic four food groups - emphasizing the concept of eating right and the use of the food groups in meal selection.

3. Weight gain assessment:
   a) Its relation to baby’s birth weight.
   b) Its relation to lactation duration.
4- Food habits and beliefs during pregnancy.
5- Food preparation, emphasising method of cooking, and methods of reducing nutrient losses as well as food hygiene.
6- Relationship of nutritional status and infectious diseases with emphasis on nutrients conservation.
7- The importance of breast feeding and proper weaning practices.
8- The importance of immunization.
9- Importance of child spacing.

III. Activities Involved:

1 Face-to-face counselling was done, almost every time the researcher talked to respondents. Through counselling the researcher helped the experimental as well as the control group to come regularly to the clinic and make the best use of facilities available. Also through counselling any educational problem or lack of knowledge in the area of nutrition was discussed with every respondent. The process of instruction was heavily influenced by Popham's Instruction Model fig. (10) described by Lovett, et al (1970) as:
For three months the experimental group was reached, in the clinic & at home, informed and helped to discuss and listen to questions about nutrition. Every one was taught through rote learning, problem solving and the discussion method. During the counselling emphasis was placed on reassuring the respondent that the main purpose was to help her obtain right information which would help her in decision making concerning food intake and the importance of nutrition during pregnancy.

2- Regular anthropometric measurement during pregnancy and after delivery as described in Chapter III.

3- Recording biochemical findings - for haemoglobin, albumen, urine and stool - for worms and blood film for malaria, were done for both groups. The educational activities were performed for the
experimental group performed for experimental and control.

4- Supsample - 10 respondents weighed their food and the researcher supervised them.

5- Some respondents (2) made graphs of their weight gain and were helped by the researcher.

IV. Educational Materials Used:

1- A pamphlet designed by the researcher, consisted of seven messages - see appendix (VI).

2- The pre- and post-test instrument with its illustrative drawings - see appendix (I).

3- Some drawings emphasizing the importance of weight gain - see appendix (VII).

Other activities involved include:

Persuasion of respondents to come regularly to the clinic after delivery through giving money to those who showed lack of money for transport. Some were given lifts to their homes. Those who came were helped in monitoring the growth of their infants and encouraged to immunize them.

VI. Learning Competencies:

After completing the learning experiences and activities, the feedback from the experimental group was positive as indicated in their knowledge score in
the post-test compared with that of the control group
and with the pre-test score.

Moreover, more than 90% of the experimental group
had started immunization for their infants compared
with the 70% of the control group.

In the area of breast feeding the educational
messages given created no apparent difference in the
types of the problem reported or duration of breast
feeding practised among the two groups. This result
may call for studying health status, daily activity,
socio-economic factors including income and educational
level and nutrition knowledge.

IV. Lesson-Design:

Following the instructional designed outlined by
Posner and Rudnitsky, (1986) and the procedures
followed in the prototype lessons - designed by the
American Home Economics Association - called "Working
with villagers", the nutrition counselling lessons were
designed.

Each of the lessons presented has the following
design.

1- It begins with a short summary of information
which includes a description of the Problem
the lesson attempts to solve, Ideas related
to the problem and objectives to be achieved
in teaching the lesson.

2- A lesson plan which presents ways of involving the respondent through discussion and sharing of information. Pictures or slides were presented, with any other materials.

3- At the end of each lesson the method of evaluation were mentioned. This evaluation was important in deciding if the lesson worked well or if it needed revision. The respondents were involved in the evaluation, and they were encouraged to discuss and ask questions.

For details of two examples of lesson content see appendix(K).

Generally there was attention to and more teaching of other topics particularly in the area of contraception during period of lactation. More emphasis is needed on teaching the lactating mothers, the correct position while breast feeding as well as encouraging infants to finish suckling from the first breast first and that no restriction should be placed on the length of time spent. This advice was emphasized by Wooldridge and Fisher (1968).

Moreover, because the heaviest drop-out rate in the two groups was observed during the confinement
period i.e. two to three months after delivery, a follow up during this period was very beneficial in pursuing teaching and filling the educational gap as well as continuing growth monitoring and immunization of the infants.

Although the researcher managed to carry out anthropometric measurements, collecting biochemical and dietary data, yet the results of these measures were not taken as an indicator to evaluate the impact of the educational programme to which the experimental group was exposed. This was because each measure of these indicators was influenced by uncontrollable factors that need more investigation. For example weight gain during pregnancy is influenced by food intake, daily activities, health status & other factors.

Summary

This chapter has been devoted to the analysis of data collected through questionnaires I, II and III addressed to samples I, II, III and IV as well as data collected through unstructured interviews addressed to sample V. Data collected were analysed to answer the study questions in chapter I. Items were presented, responses tabulated and results obtained in terms of numbers and percentages. Some results were presented in figures and some were in narrative statements.
Findings revealed the inefficiency of procedures used to implement nutrition educational programmes in M.C.H. centres. Educational objectives were too broad and general. There was a lack of educational materials as well as of funds and time. Nutrition education experts did not participate in organizing nutrition educational activities in M.C.H centres. No actual evaluation procedure was intended for respondents' performance in activities and their clinic attendance. No anthropometric measurements, i.e. weight gain during pregnancy, was performed.

The combined clinical, biochemical, anthropometric and food intake data indicated a prevalence of anaemia, malaria, low weight gain during pregnancy and poor food intake. Infants' birth weight compared very well with the local standard. Infant feeding practices notably breast feeding and introduction of supplementary food could be regarded as a parameter of acculturation and mother's perception of infants' needs. Though breast feeding was perceived as the best way and probably as a survival strategy among the poor and illiterate - yet a decline in practice was observed. Knowledge about the advantages of breast feeding strongly motivate the respondents towards practising it.

Results of the nutrition post-test showed high informational content of the experimental group in
contrast to their performance in the pre-test and in comparison to the post-test. Results of the control group were attributed mostly to part I of the test which required knowledge of specific nutrition facts, which were easy to recall. In Part II of the test which required positive attitude and the application of the knowledge, though the experimental group showed positive attitudes also some of the control were affected.

All variables studied including the socio-economic, household conditions and nutritional and health status indicators gave results which must be interpreted cautiously, due to the explanatory nature of the study as well as the multidisciplinary nature of the nutrition and nutrition educational programme.
CHAPTER V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS
CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

SUMMARY:

The specific aim of this study is to develop a nutrition educational programme for mothers attending Maternal Child/Health Centres - to provide nutrition knowledge intended to create state of awareness and understanding of the nutritional problems during pregnancy that affect nutritional and health status of mothers and their infants.

The focus is to provide practical experience of integrating preventive measure - in form of nutrition education - with curative services, within the context of the national primary health care programmes. Specifically the following objectives were stated to form the base of the study:

1. To develop an awareness in pregnant women and lactating mothers, that proper nutrition is necessary throughout life and particularly during pregnancy for having babies with desirable birth weight.
2. To provide sound basic nutrition information for pregnant women as they might effectively combat lack of nutrition knowledge concerning deficiency problems e.g. anaemia.

3. To make available a variety of reliable nutrition education resources for non formal adult educational setting.

4. Provide a variety of learning experience such as individual counseling, discussion, question and answer sessions, case study, problems solving and audiovisual materials.

5. To provide test instrument to evaluate respondent's cognitive gain in basic nutrition knowledge.

6. To provide opportunity for integrating nutritional education in M.O.H. centres.

7. To make recommendations for integrating health and nutrition educational programmes for pregnant women and lactating mothers at national level.

The conceptual framework of the study comprised the definition of the problem and scope and significance of the study. Central questions of the study were formulated as well as objectives of the study. Such effort comprised chapter I.
In chapter II literature was reviewed to give background of different approaches to nutrition education. Emphasis was given to reviewing the concepts of nutrition education and its relation to the health field. Historical developments of nutrition education activities in some developed and some developing countries including the Sudan was revealed. In addition examples of studies and programmes related to the study were included.

Baseline data needed for the development of the four main tasks or programme development was collected using more than two tools, and their full description comprised chapter III.

In Part I and II of chapter IV the collected data was analysed and some effort was made to interpret the results to find relevant answers to the questions of the study. At the same time relevant information was used to formulated the frame of the educational programme descriptive of such framework and process undertaken to develop the programme was described in part III of chapter IV.

The whole process undertaken to solve the problem under study involved three main phases. Each phase was
ever completed over, rather than the overall design evolved a series of successive approximation and further planning, the three phases were:

1. An investigation and enquiry phase.
2. Building of theoretical framework, through discussion of the findings and consultation of literature.
3. Development and implementation of the proposed programme.

The enquiry phase involved the formulation of questions. These questions were formulated into questionnaire items and interview guideline to find out concerning answers from the populations included in the study. These populations were:

I. Pregnant women attending (N.C.H.) centres.
II. Nutrition officers working in the N.C.H. centres.
III. Nutrition education/ experts had the experience of conducting nutrition education at high level system.

The three populations form: the benificial, the implemental and the experts consultant.

Interviews, observation, home visits and personal
communications were held with the different population.

Populations II and III were all included in the study. From population I samples were selected randomly and then selectively, based on specific criteria. Two groups of pregnant women were identified as a control and an experimental. Through constructed interview they were studied. Their nutritional and health status was monitored. Nutrition individual counseling using designed nutrition message, was carried out with the experimental group.

A pre test on nutrition knowledge, attitudes and practice was carried for the two groups during the fieldwork before delivery. After delivery a post test was done coupled with growth monitoring for the infants up to six months age. During this period breast feeding practices and immunization of the infant was checked. At the end of this phase all data needed was collected.

In Phase two – the collected data was analysed and discussed the amin findings were:

* There was a common awareness among all nutrition education/experts and majority of nutrition
officers that nutrition educational programmes in M.C.H. centre had broad general objective that need to be clarified and specified.

* Nutrition officers had no curricula guide. They need teaching materials, equipment for demonstration and for nutritional assessment as well nutrition laboratory. They also need supervision of the nutrition education expert in organizing and implementing nutrition education activities.

* There was great deficiency in audiovisual materials and no specified fund or time for carrying out nutrition educational activities in (M.C.H.) centres. There was not books, magazines and no library in all health centres visited.

* There was not a well established educational system not even specialized college, institute or department in the Sudan, that should be responsible for planning, organizing, implementing and evaluating nutrition educational programme.

* Teaching methods used in M.C.H. centres took the form of verbal advices during interview of the mothers. Applied nutrition activities such as food
Individual records in the 8 major (M.C.H.) centres visited, did not enquire about food intake or food habits and beliefs.

No weight monitoring for pregnant women was performed. Growth monitoring and charting was done for infants and children.

Immunization was done for the majority of children and pregnant women.

Provision of iron and folic acid tablets was practiced according to blood hemoglobin level.

Demographic data of mothers revealed that the two groups of mothers experimental and control formed a heterogeneous mixture. They had come from different regions of the Sudan. Their ages ranged between 18 - 45 years. 23% had not been to school. 5% had competed University.

Both groups - the experimental and control group showed a wide spread of nutrition illiteracy even at the first level of nutrition information that
was the terminology; not only nutrient awareness but also food. For example there was strong belief the lemon juice is the best food for children and infants and milk is very rich in every nutrient including iron. They also believed eating three meals or more, causing the focus grow too big and in turn makes delivery very difficult.

Briefly it seemed that lack of nutrition knowledge was also coupled with socio-cultural factors which in most cases were in disfavour of women since they take all the responsibility of food preparation and distribution and in rural areas over 90.0% of the food production activities. Intra familial food maldistribution and sex differentiation should be expected, since more than 65.0% of mothers reported that men and their guests were to be served first, 80% of mothers believed men should be served first.

* Regarding dietary information results of the 24 hour recall method revealed that there was poor food intake in the milk and milk group and in the vegetable and fruit group.

* Using the 24-hour recall method it not possible to figure out one meal pattern, representing, that
of the Khartoum Province, because food pattern is influenced by regional food habits, food beliefs which vary from tribe to tribe. In addition the day’s meals was observed to be influenced by income, food price, family size as well as family setting whether in suburban of Khartoum or the central.

Data collected from the combined methods of assessing nutritional status revealed cases of anaemia. (25%) worm infestations (10%) malaria attack (16%) and low weight gain during pregnancy, if compared with European standard.

One consistent aspect of these problems was the complex association and relationships between certain demographic variable such as age, income, food intake appraisal, nutritional and health status, i.e. was weight gain and birth weight. Because of this complexity it was difficult to establish any relation between anthropometric measurements that was weight gain and

a) Theoretical nutrition knowledge.
b) Food habits and nutrition knowledge.

In other word the researcher can not say that mothers who improved in their knowledge scores in the past test had now better food habits.
Moreover, food avoidance and habits of eating strange things - like mud, was prevalent among the two groups - control and experimental.

Food avoidance among mothers was found to be more influenced by fear mechanism of health haphazard than by taboos or cultural beliefs.

These findings and others collected from nutrition officers and nutrition education experts, helped in the formulation of the programme tasks that were objectives, learning experience selection of learning experience and evaluation procedures. All of these were described in part III chapter IV.

Various approaches for introducing nutrition to adult had been described presentation of such approaches was a must because of the following:

(i) Educating heterogenous group of mothers whose home origin vary in cultural food beliefs, taboos and language.

(ii) Malnutrition problem are mostly viewed as a result of many factors such as dietary socioeconomic, demographic, poverty and disease without investigating of why such factors are affecting
two or one sector of the society - namely women and children.

(iii) Trying more than one approach may facilitate the task of programme development for such sector of the society.

As mentioned above evaluating effects of nutrition educational programme was difficult because of the following:-

a- Time between the pre and post nutrition test was short for measuring the change of behaviour.

b- Method of face to face nutrition counseling which had been used required a small group for teaching - the group included in the study was large.

c- Nutritional messages given, were brief and the mother's time did not allow elaboration of these messages.

d- Difficulty in transportation.

Effective role of nutrition education as a preventive measure, in securing nutritional status of pregnant women as well as emphasizing breast feeding practices as strategies to ensure child survival and child spacing measure need more attention and investigation.
Findings revealed early stopping of breast feeding among the majority of respondents. Reasons for this were mainly urbanization and modernization influence. Malnutrition among poor women could be the uncovered reason. More deep study on food introduced will be needed, especially the practice of given too much sugar in form of lemon juice or glucose solution.

Phase three comprised the process of programme development based on the findings obtained from analysing the data collected.

The process of programme development involved the following:

Theoretical aspect of educational Philosophy
Philosophy of Nutrition Education in M.C.H. Centres.
The Programme Philosophy
A psychological Aspects of Nutrition Education.
Identification and Formulation of Objectives.
Screening of the Learning of Experiences.
Rationale for Selecting the Learning Experience.
Evaluation Procedures.

CONCLUSIONS:

The findings of the whole study had revealed data
that could permit the following conclusions:

* The responses of the different population to the different issues in programme development showed consensus for the need of developing specific educational objectives for nutrition programme offered for mothers attending M.C.H. centres.

* In general, the findings underline the need for comprehensive assessment and revision of the nutrition curricula in relation to national health programme within the primary health care.

* Finding also revealed lack of specific fund and time allotted for implementing nutrition educational activities in M.C.H. centres.

* Lack of educational materials as well as lack of clear national nutrition policy and lack of participation of nutrition education experts in organizing nutrition educational programmes in M.C.H.

* Lack of nutrition applied activities such as food demonstration except in Ondurman Comprehensive Child/Health Centre.

* Lack of evaluation instrument to assess the impact of nutrition educational objectives on the
nutritional and health status of pregnant women attending M.C.H. centres.

* Continuing education and refresher courses as well as libraries which help nutrition officers to be up to date were lacking. These deficiencies affect the quality of nutrition education, developed and implemented by the nutrition officers.

* College or institution or even nutrition department in the country is a major issue to be considered for future development of the nutrition education.

* Finally it could be stated that mothers attending M.C.H. centres could be reached monitored and taught in the area of food and nutrition through face to face nutritional message designed on collected data from various sources. Such sources include planner of nutrition educational activities, those who developed and implement the programme and those who are the user of the knowledge as well as from current literature.

RECOMMENDATIONS:

Based on the findings of the study, the following recommendations can be considered:
1. Taking into account the role of education in general and nutrition education in particular can help mothers to choose better quality diets which may contribute to optimum nutritional and health status - there should be an integration between medical services and nutrition educational activities. Such integration could be achieved if top priority is given for the problem of wide divergencies between academic and training goals on the one hand and service requirement, mother's expectations, life style and socioeconomic and cultural settings on the other hand.

2. There should be a specified fund and time allotted to nutrition educational activities as well as educational materials.

3. A realistic and specified curriculum plan is needed and/or a national dietary guidelines based on data obtained from nutritional surveillance and research.

4. A national nutrition council and regional ones for each region of the Sudan should be established. This council should be headed by a committee from various ministries and agencies that are directly and indirectly involved in implementing nutrition
and food activities. This council can act as a regulatory mechanism for nutrition education, training, provision of funds and educational facilities.

The council also can review curricula directed to all levels of nutrition educators from various disciplines - agriculture, education, health and others. The council can facilitate the establishment of applied nutrition programmes such as animal husbandry and horticulture practices in schools, in homes and rehabilitation residence centres.

5. Mass-media programmes should include nutrition educational messages for public with emphasis to young children, pregnant women and lactating mothers. Such nutrition educational message should be developed by nutrition specialists.

6. A national food and nutrition policy should be formulated by ministries concerned. Emphasis should be put on food availability and food price-control.

7. Nutrition education should be given in school for both sexes, boys and girls.

8. In adult literacy classes it is important that the
curriculum be relevant to problems facing women and their children. For example teaching should include necessary skills, in agriculture science, environmental problem, household and food hygiene, consumerism and food marketing and food nutrient conservation.

9. At antimal level, universal nutrition literacy could be a priority of a national policy related to nutrition education. The aim of national nutrition literacy should be to enable citizens to utilize knowledge of food and nutrition necessary to promotion and maintenance of health. Curricula should be developed within school, youth club, non sociocultural unions and health centres as a means of developing beneficial food behaviour. The principle of conservation of food and nutrients should be emphasized in all nutrition educational efforts.

10. There should be an increased number of nutrition educators to meet growth demand of educational institutions literacy classes, and W.C.N centres.

SUGGESTIONS FOR FURTHER STUDIES:

1. The proposed nutrition educational programme could
be implemented in other regions of the Sudan.

2. Nutrition education activities such as supplementary feeding programmes, nutrition surveillance and others, represent wide field area of research, with broad objective to achieve, there should be a specific study for each activity.

3. A study could be conducted to discover correlation between learner general characteristic such age, parity, level of education, household facilities available and nutrition behaviour. For example a study about sociocultural variables and correlation with nutritional and health status of mothers in urban and/or rural areas.

4. A study could be conducted using food supplement as teaching tool to evaluate degree of knowledge, attitude and behavioural change.

5. A study and a educational programme that emphasizing, one to one nutrition counseling, home visiting, follow up and using of mass-media including tapes could be done. In such a study data gathering instruments should be expanded to include households tasks performed by women, nutrients intake and sex disparities in food
distribution, in order to evaluate the effectiveness of a particular instrument used for date collection.

6. A study that examines the potential benefit for using growth charts for pregnancy women to teach them the importance of obtaining optimum weight gain and evaluate effect of teaching on having babies with desirable birth weight.

7. A study should be conducted to look for nutrition information content in medical curricula at all levels to identify medical nutrition activities that should be offered to mothers in rural and nomadic areas of the Sudan.

8. A study that analyses women role's in food production - including human milk, is needed to ensure that agricultural and economic planning is based on most appropriate information about local potential for food provision.


- Den Hartog, C. and T. Van Schark (1946), Voeding, 6, 208


Section A

General and Health Information

1) Name of the pregnant Woman: _______________________
2) Address (Place of living): _______________________
3) How long have you been living in your present address? ________________
4) Home (origin) province?
5) Age (in years) ? ... 6 No of years of marriage
7) Religion .............? ....
8) No of children ............. alive ............. dead
9) What is the age of the youngest .
10) Health conditions:
(A) How would you describe your health
    healthy  not very healthy
(B) The investigator's observation and clinical
    looks healthy  Not healthy
    looks pale
## Anthropometric and Biochemical Investigations

<table>
<thead>
<tr>
<th>Date of visits</th>
<th>Ht. on</th>
<th>Body Wt.</th>
<th>No of week</th>
<th>Body wk</th>
<th>Blood HB</th>
<th>Blood press.</th>
<th>Drive</th>
<th>Stool</th>
<th>Abnormal</th>
<th>Abnormal</th>
<th>Comment</th>
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</table>
Section B (i) Dietary Habits

1) No of meals you usually eat everyday before pregnancy?

2) No of meals you eat during pregnancy per day?

3) Do you eat any special foods during pregnancy?
   Yes ....  No ....

4) If yes
   Specify with reasons?
   Sp. Ed.  Reason
   1.
   2.
   3.

5) Do you avoid any foods during pregnancy?
   Yes ....  No ....

6) Food avoid  Reason
   1.
   2.
   3.

7) Did you get any special instructions about food and
   Nutrition during pregnancy?
   Yes ....  No ....
   If yes (A) What e.g. special food
   or special ceremony?

(B) From whom?
   - Mother / Mother in law
   - Doctor
   - Midwives
   - Radio
   - Others

8) What did you eat and drink in the last 24 hours?
<table>
<thead>
<tr>
<th>Meals</th>
<th>Food Items</th>
<th>Fd. Categories on basis of physical composition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Building Energy</td>
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</tbody>
</table>
(10) Who select & buy the food for you?  
  Husband ...............  
  Your mother ...........  
  Yourself ..............  
  Others ................

(11) Who prepare the food?  
  You-yourself ...........  
  Your mother ...........  
  Others .................

(12) Who distribute the food?  
  You-yourself ...........  
  Your mother ...........  
  Others .................

(13) Who is served first  
  ........................
  ........................

(14) Do you eat alone or with other member of the family?  

Food beliefs  

15- Do you think what you eat during pregnancy?  
  1) Enough  
  2) Less  
  3) More

16- Have ever heard of a woman eating such material?  
  Clay  
  Mud  
  Starch  
  Else  

  Yes ......  
  No. ......  

17- If yes specify with reasons:  
  ...........................................  
  ...........................................  
  ...........................................  

Socioeconomic data

Section G

1. Education level:
   - illiterate
   - primary
   - Intermediate
   - Secondary
   - Above secondary

2. Type of occupation (Other than housewife)?
   - skilled labour (e.g., clerk)
   - unskilled labour
   - partially skilled (e.g., machine operator)
   - teacher
   - others

3. Average total of family income?

4. How much of it is spent on food?

5. No of household members other than the Nuclear family.

6. Is the house?
   - Rented
   - Owned
   - Others

7. No of Rooms?

8. Availability of toilet?
   - Pithole
   - Bucket
   - Syphon
   - Others

9. Type of water supply?
   - Public
   - Communal
   - Others

10. Availability of kitchen?
    - Yes
    - No

11. Facilities in the house?
    - Electricity: Yes/No
    - Refrigerator: Yes/No
    - Radio: Yes/No
    - Television: Yes/No
12. Do you keep in the house domestic animals?
   Yes ...... No ......
13. If yes, for what reasons do you keep them?
   .......... Cash ...... Cash & Consumption .......... Consumption
14. Do you keep poultry in the house?
   .......... Yes ...... No ......
15. If yes for what reason the products is used?
   Cash ...... Cash & Consumption .......... Consumption ......
Define the word nutrition?

From the following list of foods select 5 ones that are rich in Protein:
- Eggs
- Beef
- Fish
- Cheese
- Yogurt
- Chicken
- Potatoes
- Peanuts
- Tomatoes
- Lentils
- Almonds
- Nuts

From the following list of foods select 5 ones that are rich in Iron:
- Liver
- Kidney
- Spinach
- Milk
- Meat
- Eggs
- Sesame seeds
- Watercress
- Dates
- Lentils

From the following list of foods select 5 ones that are rich in Calcium:
- Meat
- Egg
- Fish
- Tomatoes
- Cheese
- Yogurt
- Cheese
- Milk
- Spinach
- Peanuts
- Nuts

From the following list of nutrients select the main 6 nutrients?
- Minerals: Iron, Calcium, Sodium, Fat, Sugar, Fiber

Components of "Bharani" Stew dish can provide the body with many nutrients; mention 5 of them?
- Milk
- Pulses
- Red meat
- Nuts
- Carbohydrates

Answer the following impressions by saying/writing Yes or No?

A. Laxon juice is very nutritious for infants and children: Yes

B. Watercress (Eruca Sativa) is very rich in minerals especially Calcium: Yes

C. Milk is rich in minerals especially Iron: Yes

D. Bottle feeding is more beneficial to infants than breast-feeding: No

Nutrition foods that are important for blood formation?
1. Iron
2. Folic Acid
3. Vitamin B12
4. Vitamin C
DO YOU KNOW THE FOUR FOOD GROUPS?

YES _______ NO _______

IF YES, FROM THE FOLLOWING DRAWINGS PUT A (✓) IN THE BOX THAT SHOWS ALL THE FOUR FOOD GROUPS.

MILK  MEAT  WATERMELON  BREAD

ORANGE  BREAD  CARROT  CHICKEN

TEA  BISCUITS  MILK  BREAD

MEAT  GREEN VEG  FISH  EGGS
30. Do you believe that a pregnant woman should eat at least 3 meals per day?
   Agree ............. Disagree ............. Not sure ............

11. Do you believe that increase of weight after the 9th of pregnancy at the rate of one kilogram per month is desirable?
   Agree ............. Disagree ............. Not sure ............

12. Do you think eating strange things such as mud and chalk during pregnancy is beneficial?
   Agree (or yes)....... Disagree (or no) ........ Not sure ...........

13. Do you think that planning balanced meals based on the four food groups is essential?
   Agree (or yes)....... Disagree (or no) ........ Not sure ...........

14. Do you think that planning balanced meals based on the four food groups is essential?
   Agree (or Yes) Disagree (or No) Not sure ............

15. Do you think poultry in the home is more cheaper than buying eggs and chicken?
   Agree ............. Disagree ............. Not sure ............

16. Do you think nutrition education should be taught to both girls and boys?
   Agree ............. Disagree ............. Not sure ............

17. Do you believe that regular monitoring of nutritional status during pregnancy is beneficial?
   Agree ............. Disagree ............. Not sure ............

18. Do you think spacing your children at intervals of three years is desirable for them and for your own sake?
   Agree ............. Disagree ............. Not sure ............

19. Do you think boiling and roasting food is more efficient than boiling and frying in preserving nutrients?
   Agree ............. Disagree ............. Not sure ............

20. Do you think weaning children suddenly and keeping them away from their mothers is a harmful habit?
   Agree ............. Disagree ............. Not sure ............
## Food Record Format

Addressed to Sub-Sample from Pregnant Women and Lactating Mothers

<table>
<thead>
<tr>
<th>What Did You Eat</th>
<th>Amount in Gm.</th>
<th>Time of the Day</th>
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</table>
UNIVERSITY OF KHARTOUM
FACTORY OF EDUCATION
Questionnaire No. II
Addressed to lactating mothers

SECTION A Infant feeding practices
Name of Index not-
1. Method of delivery: Normal ........... up normal
2. Place of delivery: home—public hospital—private hospital.
3. (a) Methods of infant feeding:
   Breast feeding
   Artificial feeding
   Both
(b) If Artificial why ?

4. When have you started breast feeding?
   First day
   Second day
   Third day
   Fourth day

5. How do you breast feed the baby ?
   On Demand
   On Clock (or schedule)
   On Both

6. (a) For how long you intend to breast feed you baby?
   3 months
   6 Months
   One year
   Two years
(b) Why

7. Did you get any information concerning infant feeding
   Yes ........... No ...........
   If yes from whom?

8. (a) When do you introduce supplementary food?
(b) Mention the first food you had introduced?

9. (c) How had you weaned your older children—suddenly gradually
(b) When did you wean your previous children

10. (a) Have you heard of Family planning ?
    Yes ........... No ...........
(b) If yes do you want another one? in receipt of
(c) How many children do you decide to have ?

11. (a) Have you been immunized during pregnancy
    Yes ........... No ...........

12. Have you started immunizing your baby?
    Yes ........... No ...........
(12). Birth weight/hight and weight gain of the infant for 6 months.

<table>
<thead>
<tr>
<th>NUT STATUS</th>
<th>WEIGHT</th>
<th>HEIGHT</th>
<th>BREAST FEEDING</th>
<th>NO BREAST FEEDING</th>
<th>ANY COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIRTH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ONE MONTH</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>TWO MONTHS</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>THREE MONTHS</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>FOUR MONTHS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>FIVE MONTHS</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>SIX MONTHS</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

SECTION (B) Dietary Habits

3) Types of food and drink you have taken immediately after delivery.

No or meals usually taken daily after delivery.

14)(a) Do you eat any special food during lactation?

   Yes ........ No ....

   If yes specify with reason.

   special food reason
   1-
   2-
   3-

15)(a) Do you avoid any food or drink during lactation?

   Yes ........ No ....

   (b) If yes specify with reason.

   Food avoided reason
   1-
   2-
   3-

4) Do you smoke?

   YES
(17) Do you have received any special instruction about food and nutrition during lactation? If yes, from whom.
- Mother/Mother-in-law
- Doctor
- Radio
- Other

(18) What did you eat and drink during the last 24 hours?

<table>
<thead>
<tr>
<th>MEALS</th>
<th>FOOD ITEMS</th>
<th>FOURTH FOOD GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BUILDING</td>
<td>ENERGY</td>
</tr>
<tr>
<td></td>
<td>FOODS</td>
<td>PROTECTIVE</td>
</tr>
<tr>
<td></td>
<td>MILK MEAT</td>
<td>VEG.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FRUIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CARR. FATS</td>
</tr>
</tbody>
</table>
6) Is the specified time allotted to nutrition educational activities?
   Yes ............................ No ..............................

7) A) Are you satisfied with the educational effort you performed?
   Yes ............................ to some extent ............ No ...........

   B) If you are not satisfied why - give reasons
      1) 
      2) 
      3) 

8) C) Have you any plan to evaluate the impact of the nutrition activities you are performing?
    Yes ............................ No ..............................
    If Yes how?

9) A) Do you believe that the nutrition activities you are performing are relevant to achieve the specified objectives?
    Yes ............................ No ..............................

   B) If no have you any suggestion that might make the achievement of objective possible?

10) A) Do you think the number of health workers and nutrition educators in the health center are enough to fulfill the programme activities?
    Yes ............................ No ..............................

    B) Are they trained enough to perform nutrition educational programme?
    Yes ............................ No ..............................

10) Are there nutrition education experts attending the (H.C.A.) centers and participate in organizing the nutrition educational activities?
    Yes ............................ No ..............................

Thank you
Interview Guidelines Addressed to Nutrition Education/Experts

Research Problem Title:
Development of nutrition educational programme for mothers attending maternal / child health centre

Dear Dr./Prof.

As we all know education has been proved to have a profound effect on its recipients, imparting not only literacy and numeracy but the ability to take control in many aspects of personal health and economic life. Nutrition education is no exception particularly when experts in the field share a cooperative responsibility of formulating a goal-oriented programme.

The researcher of the above problem felt that development of a nutrition educational programme that puts emphasis on pre and postnatal care, proper breast-feeding, treatment of infant and children diarrhoeal diseases by the use of oral rehydration therapy (O.R.T) as well as helping mothers to formulate complementary diets, can provide an invaluable supplement to the formal services in M.C.H. centres.

Development of such programme in a developing country like the Sudan with low income, high literacy, heavy work load in M.C.H., is a challenge. Thus the researcher would gratefully appreciate your participation with your knowledge and experience, by answering the following questions. Such questions covered the four major tasks of programme development.

All Objectives of Nutrition Educational Activities
Performed in M.C.H. Centres:

Is there an overall stated philosophy and objectives, formulated policy and strategies to direct and guide nutrition educational activities.
Is there a nutrition education system responsible for planning & implementing nutrition educational activities?

B) Selection of the Learning Experience:

What types of nutrition information need to be formulated and addressed to mothers attending M.C.H. centres?

C) Organization of the Learning Experience:

Who should organize and teach nutrition in M.C.H. centres and in the country?

Have the nutrition officers a leading role in the organization and evaluation of the learning experience in M.C.H. centres?

D) Evaluation Procedures:

Is there a nutrition education system responsible for the evaluation of the nutrition educational programme performed in M.C.H. centres?

Thank you,

Mariam Emamzad Lihida
APPENDIX VI
<table>
<thead>
<tr>
<th>Item</th>
<th>Weight (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast and tissues around breast</td>
<td>4 1/2</td>
</tr>
<tr>
<td>Amniotic fluids (bag of waters)</td>
<td>2</td>
</tr>
<tr>
<td>Uterus &quot;womb&quot;</td>
<td>2 1/2</td>
</tr>
<tr>
<td>Blood supply</td>
<td>6 1/2</td>
</tr>
<tr>
<td>Placenta</td>
<td>1 1/2</td>
</tr>
<tr>
<td>Baby</td>
<td>7 1/2</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
</tbody>
</table>
Example 1: Summary for Planning -

Lesson 1: Feeding the Pregnant Woman -

I- Problem:

This lesson helps women solve this problem:
Some pregnant women suffer from malnutrition because of poor food intake and continuous attack of malaria. As a result, their babies are born with low weight and they can’t provide adequate quantity of breast milk to their babies.

I- Ideas: Important Ideas -

1) Pregnant women and lactating mothers need good diet.
2) A good diet is important for health of the mother, for the fetus and for having enough breast milk.
3) Continuous attack of malaria affects the health and the nutritional status.
4) There are various ways to combat mosquitoes.

III- Objectives:

When the lesson is over, the pregnant woman should be able to:

Know what she would eat and how infectious diseases affect her health, her nutritional status and growth of her fetus.

IV- Suggested Audience:

Group of women and possibly their husbands.
V- **Suggested Materials and Supplies for this lesson**

Picture card or food stuffs for pregnant women.

VI- **Things to do**

1) **To get the group interested:**

Place on the flannel, or blackboard the picture card or food stuffs: Say, greetings and comment on the last meeting.

2) **To get discussion going:** Ask-

   i) What kind of food you eat when you are pregnant.

   ii) Because of a pregnant woman is carrying a baby within her and what she eats must also make the baby grow. Do you think one should try to eat any special foods.

Allow time for good discussion, based on their responses, move on presentation of pictures or materials.

3) **To Share information and Build Skills:**

Discuss the nutritional needs of pregnant women. Involve the women in the discussion, emphasizing the importance of eating vegetables, fruits and protein rich foods for:

- Mother's health
- For the growing baby in her body
- For production of plenty of breast milk when the child is born
Discuss if pregnant have symptoms of malaria. Let the group discuss this problem. Some of the responses might be: stop working in the house and have complete bed rest. Drink local beverages. Go to the clinic for blood film test for malaria and for treatment.

Ask women to discuss various ways of cleaning the environment—particularly the water-disposal problem.

4/ To Review and Sum Up:

Using pictures again to:

1) to emphasize importance of the balanced diet - for the mother and for the baby.

5/ to Follow Up:

i) Depending on the group's interest, next lesson may be on infant feeding.

ii) Plan individual home visits as requested.

iii) Invite health worker or community development worker to help in teaching environmental health problems.

6/ To Decide if the Lesson was Successful:

a) At the end of meeting ask the group or an individual to name at least two foods easy to get, that a pregnancy women should eat.

"Remember you are testing the lesson & not the respondent"
b) Ask your self the following questions and write down the answer in your note book. After using the lesson several time, review answer and needed changes in the lesson.

i) Were group member interested in discussing foods they eat during pregnancy.

ii) Was the group willing to discuss ways to combat mosquitoes? How many asked for a home visit?

iii) What questions did respondents ask most often?
Example 2:
Lesson 2: **Importance of Breast Feeding**

**Summary for Planning this Lesson:**

I- **Problem:**

This lesson helps to solve this problem: most babies are born healthy. But before they are five years of age, many babies become malnourished and some may die. Some reasons babies become malnourished are:

- Babies breastfed up to the ages 4-6 months usually are healthy. But then mother suddenly change babies to bottle feeding and/or starchy weaning foods and babies become sick.

- Some mother are themselves malnourished. They do not have enough milk for their babies.

- When bottle feeding is started, the powdered or canned milk may be too diluted with water. And this water may not be pure.

When babies do not receive enough of the right food, they grow weak. Weak babies can not fight diarrhoea or childhood illnesses such as measles and they die.

2- **Important Idea is this Lesson:**

- Breastmilk is the natural food. **It is easy to digest. It contains everything a baby needs for health and growth up to three and four months of age.**

Breast milk costs **no money** and it makes **no work** for the mother.
- A baby who is breast fed up to a year or longer is more likely to live and to be healthy especially if the mother herself is well nourished.

- Breast-feeding does not prevent pregnancy. When a lactating mother become pregnant, she her baby suddenly and this is not good for the baby.

- Although breast milk is the best food, babies need other soft food as early as three months. These soft foods must be clean and safe, and be introduced gradually.

3- Objectives:

At the end lesson the women will able to:

A) Explain the relationship between breast-feeding practices and infant health.

B) Give reasons why women should breastfeed as long as possible if the mother is healthy.

C) Correctly explain that breast-feeding does not prevent pregnancy.

4- Suggested audiences:

Group of mothers with or without babies.

5- Suggested Materials and Supplies for the Lesson:

Poster with real life pictures of a healthy baby and a malnourished baby.
Pictures of:
- Healthy baby. "Same as poster".
- Sick baby "Same as poster".
- Mother Nursing baby.
- Mother feeding baby with cup and spoon.
- dirty nursing bottle.
- Boiled water.
- Water from stream or a well.
- Flannel board or other means for displaying pictures.

6- Things to do:

A) To get the group interested:

If possible: Before the meeting, place two posters of real life babies, (Possibly from the health centre). One picture of a healthy baby by picture of a malnourished baby. Under the pictures write: What is the difference between these two babies and why?

B) To get discussion going:

Ask:

Can someone tell me the differences between these two babies? What might have caused the differences?

Allow a few minutes for answer and accept all the reasons the women offer.

You have given some good reasons why some babies are weak and other are strong. How it happened I know the two babies who look just like these two in the pictures, "Give the babies names". Their parents live in the same village I visited.
"I must tell you that both babies were nice and healthy when they were born. Both of the two young mothers breast fed their babies at first. What could have caused the difference between the two babies? I will tell because I know. It had to do with what these two babies ate and also with what their mothers ate.

We know all mothers want their babies to look healthy. So if you like, we can talk about important things to do to have healthy babies. Today we talk about breast-feeding.

"Put picture of breast-feeding on the flannel board"

"Put up picture of cup and spoon feeding"

C) To share Information:

Ask mother how long they breastfed their babies and why?

Guide discussion so the following points are emphasized:

Breast milk is the natural food for the baby:
- It contains everything a little baby needs for health and growth.
- Breast feeding is easy for the mother — no bottles to prepare.
- Breast milk costs no money.

But some mothers can not breastfeed because they are sick or have a breast abscess, etc. But there is another reason that some mother stop breastfeed too early and suddenly if they get pregnant.
As the discussion goes on, help mothers to emphasize the following points:

- The healthy baby his mother continues breastfeeding as long as possible.

- She boils water from the stream or well before giving to the baby, because she knows little babies are very delicate inside and can’t stand drinks as the family without becoming ill.

"Place picture of boiled water-under the picture of the healthy baby."

- The healthy baby his mother knows when to start giving him other foods and how to prepare them. And she always feeds him with a very clean cup and spoon. “Remind the audience that will be discussed and demonstrated at the next meeting”.

D) Review and sum up:

Remove all cards from board except those of the two babies.

Then hold the card one at a time and ask different women to come up or tell you and put each picture card below the right baby picture. Ask each person who does so to give her reasons.

If some made a mistake ask the group to comment. When all the cards have correctly placed on the board.

Repeat the messages.

Say: “We have talked about the fact that breast milk is the best food for babies but we know that some mothers have to
bottle feed their babies for a variety of reasons. Those may be good reasons, but when bottle is used, it must be done with care: We will discuss that used next meeting.

E) To follow up:

Ask the group whether some would like you to make a home visit. Plan for these visits. These visits should include more information on breast-feeding and care and feeding of young babies.

7- To Decide if the Lesson was successful:

a) At the end of the meeting, ask 4 or 5 of the audience either individually or as a group - to help you by answering the following question. Tell them you want their answers so that you can improve the lesson. Remember you are testing the lesson, not the audience.

"Please tell me how a baby's health is affected by breast-feeding?"

Expect answers such as:

1. Breast-feeding helps keep a baby well and

"Can you think of at least three reasons why mothers should breastfeed as long as possible".

Expect answer as:

Makes a baby

cost no money

Easier for mother-no work & no bottle to prepare.
Does breast-feeding prevent pregnancy?

Expect answer No.

b) After the lesson Ask your self the following questions and write down the answer in you notebook. After using the lesson several times, review and make needed changes in the lesson.

i- Where you able to put up poster announcing the lesson before the meeting took place? How soon before? Where did you put them?

ii- Did the posters bring women to the meeting? Why or why not?
المثال الأول: ملخص تحليل الفرع

المثال الأول: نظرية الحامل والمريض:

1. السؤال: لماذا يستخدم هذا الفرع على حل المشكلة التالية؟

تعاني بعض الشعوب من سوء الشذوذات الناتجة عن انسانيات مأخوذة في الحالة، نتيجةً لتعرضهم إلى الإكراه بضرورة الارتباط، ولذا ينصح باتخاذ هذه المشكلة التي تكون العوامل الجديدة في زمن النسل. لناتج عن العملية كما أن المريض لا يستطيع إجراء اللجم الكافي لإجبار الطفل.

2. الإجابة:

أولاً الحاملات والمرضى ينتمون إلى نظام معين من النجاعة الكافية.

النظام يتطلب البقاء الطبيعية، الرجل والطفل، الذي ينمو في وسطه وينتظر النمو، والإجبار الكافي لإجباره.

الإجبار المبكر يضمن الطبيعة وتؤثر على جسم الأم وعلى فقدان العناصر الطبيعية ويؤثر على المستوي الغذائي.

عندما تكون فحوصات بعيدة، للتأكد من صحة الطفل.

3. الإجابة:

في حالة هذا الفرع يجب أن تكون الأم قد تأكدت وركبت تسعة أشهر من الطبيعة، وتم إجراء الفحوصات على النحو الصحيح، وتم إجراء الفحوصات على النحو الصحيح.

4. التابع:

يجب تنبيه الأموات إذا امكنت تواجدام في المركز.
(1) الاتجاهات للتغيير: بين غذاء المرأة الحامل ونومها. (2) الاتجاهات في الأمراض الولادة. (3) الاتجاهات في الأمراض أثناء الإباضة. (4) الاتجاهات في الأمراض بعد الإباضة.

(2) الاتجاهات في الولادة: بين الإجهاض والولادة. (3) الاتجاهات في الأمراض الولادة. (4) الاتجاهات في الأمراض أثناء الإباضة. (5) الاتجاهات في الأمراض بعد الإباضة.

(3) الاتجاهات في الأمراض: بين الإجهاض والولادة. (2) الاتجاهات في الأمراض الولادة. (3) الاتجاهات في الأمراض أثناء الإباضة. (4) الاتجاهات في الأمراض بعد الإباضة.

(4) الاتجاهات في الأمراض: بين الإجهاض والولادة. (2) الاتجاهات في الأمراض الولادة. (3) الاتجاهات في الأمراض أثناء الإباضة. (4) الاتجاهات في الأمراض بعد الإباضة.
د) مراجعة وتدقيق النص

العلاقَة بين الحافظة ونوعية النص يمكنني ذكر بعض أساساء المادة الموجودة في
الموقع، وذلك يجب أن تكون اكتشافات النص الحامل وال($) ..หาก أمكن أن النص الحامل
ليس عليه فقط أن تكون حسابات النص الحامل الذي في زمنه قبل أنها أيضا تفقد أثناء
الوادعة كمية من الدم والنحوة. وإذا تجاهل النص هذه وفاح إذا استمرت بعض الأمور،

المتتالية أن

- النص النشط قد يكون تقنية المعلوم أو أي درس وذلك حسب رغبة الجامعة.
- رئي الأدوات الخاصة.
- أدى النص النشط للمساعدة في تقديم درس في صحة المستمع.

و، للتحدي من نجاح النص:

أساليب الحافظة في نهاية الاجتماع تما فريدة أو جماعي و، وأخيرًا أن نجح بين
مساعدات على تحضير التهمة، وتذكير انتظام التحميل أو تمزج النص، ورسائل الحافظة.

الحواري من ذلك يمكننا أن نفهم من النص، يجب أن ينتقلي النص الحامل من المهن،
أساليب نفسية التفاعلية بعد النص، أو النص الإيجابية في مفروض ونسبة
استخدام النص عدد مرات راجع النص، وعليه على تحضير،

إلى كانت المجموعة سيطرة بناءة موضوع النصية إيما، فتره الحمل؟
هل كانت للمجموعة النظرية في التحدث عن مكانة النص في وشفاقة الصحة ك، واحد؟
هل التأكيد على أن نص النص لأعمال النصين-
ما الاستعلام التي سأثنى الحافظة في النص الإيجابي.
الأطباء الثانوي

القرن الثاني - أهمية الوظيفة الطبيعية

ملخص تجربة القدر

العلاج

يحذى هذا الدرس على حال المشكلة الطبيعية.

يولد الغلب للذيني بعض المشاكل، ولكن الكثيرين منهم يعانون من نفس المشكلة لدرجات كبيرة.

تؤدي إلي الاختيارات القرينة من أسباب نفس المشكلة عند الأطفال.

أ. ينتج الطفل عادة من كره، الرأى إلى السامد من العمر بعدة جيدة نتيجة لحليب الأم.

ولكن بعض الأطفال يعانون من معتقدات افلاتات فينها على طعام ميل بالنشويات والمكتبات مماثلة.

ب. بسبب مرض الأطفال.

ب) تعاني بعض الأعشاب من سوء التغذية مما يؤدي إلى نفس لبسين اللزمن لانتظام اطالتين.

ج. عند النقل مما يكون الحليب الجاف أو السائل وسيلة كمية كبيرة من الماء، وصائد.

لا يكون هذا النماطم.

وعنما لا يجسح الطفل على الاختيارات الكافئ، والمصل يصبح ضعيفًا، لا يستطيع مكافحة أمراض

الإنفلونزا أو إراز الظليل في الحمية مثلًا مما يؤدي إلى الوفاة.

الآثار الجانبية في هذا الدرس.

أ. لا من الأم هو الطعام الطبيعي للأنفلونزا، وأي ميلي الليم يحتوي على كل ما يحتاجه الطفل من غذاء، لا النزيف، أو النزيف من النزيف.

ب. لا من الأم لا يقلل ماليا ولا يقبل أي عمل أو نزيف من جماهيرة.

ه. أن الطفل الذي يشكي على لدنهم أن يبلغ السن من العمر أو أكثر يعيش منهما.

يجب الحفظ، وقائي إذا كانت الأم تعني مسح.
الرسالة لا تسمح الحمل: عندما تصبح المرأة فائدة للتنحيل,

بعد تقديم الرعاية، يجب أن تكون المرأة على الراحة، وتلقي الرعاية من الطبيب.

لا يمكن التعامل مع الحمل دون الرعاية والتأمل.

الأنثى المناسبة للحمل:

1. إذا كنت مسلمة في الحمل، فلن تتحمل أي مسؤولية.
2. إذا كنت تتحملالحمل، فلن تتحمل أي مسؤولية.
3. إذا كنت مسلمة في الحمل، فلن تتحمل أي مسؤولية.
4. إذا كنت مسلمة في الحمل، فلن تتحمل أي مسؤولية.
5. إذا كنت مسلمة في الحمل، فلن تتحمل أي مسؤولية.
لا توجد نص يمكن قراءته بشكل طبيعي من الصورة المقدمة.
المراجعة النصية:

إن تذكر كل السور من على النحو ما ساعد صبر الظفلين، واري السجود الصور الأخرى كشيئ.
على حال، وإساب كل واحدة إن تخبرك أي توضع الخوف تحت الخوف ذو الصحة الجيدة أو الأزهق وإسالي كل واحدة من الصبي في اختيارها لهذا التوقع، وإذا ارتكبت اعدادا خطأ.
إذ كا السجود أن تصبح هذا الخطا.

وأخيراً فإنه قد تحدث عن اهتمام مختصر، ولكن يمكن أن يصبح السجود إلى الفقهاء أو الاستعانة بالجزائر، وإذا كان لا بناء على ذلك يديه أن يرسم.
يمكن الشروط الجديدة، وسنتعامل هذا ا씨ا في اجتماعنا القادمة.

إذ كا إذا كان يقتضي في النمو، فإنه البررة يجب أن تحتل معلومات كתקשורת في الروضة والمباشرة بالخدمة عند الأطفال.

فلأكد من نجاح النحو، فإنه إذا كان مسحوبة، أو عينة من المفاهيم، كل على حدة أو بشكل جميعها.

أخطأ كبير تتلو صحة الخوف بالرضاعة؟

فهي الأدوات كالاسماء؟

الرضاعة ساعد على النحو على صحة الخوف بشكل جيد.

على تشبيهين ذكر ثلاثة اسباب على الأقل، والتي من أجلها يجب أن توضع طمئنها أطول فترة ممكنة؟

أ/ تجعل الطفل يضعم بسمة جيدة

ب/ ليس هناك تكلفة مادية

ج/ أرسل للám فلن يطلب تحضر
أسماء المجموعة ما الذي يمكن أن يكون بأكله الطفل بعد أن أطعمنه في؟
ما السبب في تجارة طفل مكتشف للحريضة في طفلة هزل يعنينا عن سوء السنية؟
حاولنا كثرة هذه النقاط للمساعدة على التفكير في الأولين التالية:
ربما أظهرت حميب المطر أو النمن أو الحليب السائل المجفف بال والفان
ربما لم تكن والدته تعرف كيف تทานه على نطاق واسع وتقييم الارادة.
"سيورة الوجادة" النصيرة في صورة الطفل الشعبي.
ربما اضطرنا لا نستطيع تغلي السكر والماء.
ربما كان بrawlها ما غير سمع في من المحرك أو الطرفة.
قبل السباحة تتأكيد من أن المجموعة قد ناقشت بأدوات الإدام المبينة.
اشترى الفن صبي الحال في الشارع الجيدة - كيف تظلون إن ألمه افتعت به تجربته للحياة.
نذاع الطفل الحدود 4 إحياء السالبة أكتري على هذه النقاط.
- والكل، تحتاج إلاقاتنا اطلال قوية تذكره.
- نقل النساء الفجر من 어فة قبل أن تظهر له طفلاً لبضم أن سحة الأطفال جيدة.
"لا تستطيعون ما وسائل كثير من جراحات،
"سيورة استاد المشابه".
- 6- أن ألمه على هذا اجتياحاً، ألمه، لاحة المتفاوتة وترك تحريدة! وكانت تشمل
الأعمال الحديثة "ذكري الحواي" إن نداء المجموعة سيطر في الابتعاد الواقع.
"سيورة الصبي والمحم والمحاذر تحت صورة الطفل ذو الصمة الجيدة.
"نأتي بعد التأكد أن المجموعة تمثالية وفي اكتمال سرح الفعالية الجيدة لأطفال الطفل.
- مركز الإبداع مشابه الثقافة.
- لسه الأم اتصلت نفسي طفلة وقاتما الأم تمتعت بحالة جيدة ولا تعاني من
هيم لسرب بسبب أن روعي طفلاً.
- الرشاد لا تتسابح الحناء، ولكن هناك طرف آخر لتسبي الحناء.
APPENDIX XI
إعداد برامج قريبة تفاعلية للإمارات المتواجدة علىمراكز حماة الأسرة والمطبخ
بعضهما البعض

الاسم المهتم

الخطوات

1. تقديم خرائط تحليلية في مجال التغذية وتقيس مستويات الغذاء للإمارات.
2. إعداد وصيانة نظاميا لقياس وتوزيع ما تقدمه الإمارات من معلومات قبل وبعد تنفيذ المشروع التحليلي.
3. تنفيذ برامج توفير ومتاحات تغذية بالداخليات الصحية الغذائية في مراكز حماة الأسرة.
4. استخدام النظام الإلكتروني لإعداد هذا الموقع التحليلي بأخذ في الحسبان أن إعداد
الإمارات بالتفاصيل والمعلومات الخاصة بالمطاعم التحفيزية سيؤدي في تحسين مساحة المطاعم التحفيزية
وسيشير الإمارات بخطورة ممارسة المطاعم القائمة مثل كل المطاعم أثناء فترة العمل وينبغي تنظيم
تحسن المستوى الفعّالي، استمرت المرأة بنجاح علمياً وتطالب بالحقوق في مختلف المجالات، وتوجت من خلال هذا التحصيل النشاط المعرفي، ووجدت في النهاية أن المرأة لها القدرة على الإنتاجية وتحقيق النجاح في مجالات متعددة.

النتائج الإحصائية للدراسات الميدانية:

1. تطوير وضمان أدلة التحليل المنطقي للدراسات.
2. إعداد وتقديم جزئيات علمية تحليل مع المشاكل التقنية والظروف.
3. تنفيذ هذه الدراسات تطبيقياً بشكل تدريجي.
4. توفير وسائل علمية لقياس الجودة العلمية.

لكن تعديلات تعديل الإصدار على الإيجابيات والمساهمات، كان لإنتاج دراسة الإجابات، واستناداً إلى الخبرة. لذا أعدت الجودة في المرحلة الأولى دراسة الإجابات التالية:

1. إعداد وتحريج بروغرين على مشكلة بحث الإجابة والمقدمة.
2. تحليلات التقديم.
3. إجابة الترميم الإجابة.

/ اختصار الترميم الإجابة.

/ اختصار الأدوات المستخدمة في الاستماعية عن حسب معايير محددة لإعداد الإجابة الأولي.
لمست هذه المجموعة إلى مجموعتين - مجموعة تم تقسيم الإرشادات في التربية ومعلومات تم تطبيق

وعبت دراسة هذه الفقرة كنماذج التحقيق الجامعي - الاجتماعية والاجتماعية والتروت الموجودة بالعربية،

ص 24 نعم الفنون الثقافية كنماذج التدريس الإيجابي يعملي بمسار محققة الموسيقى والخطورة - وتبين

خريجات تسمى الطموح المزاجية - خاصة البداور وكلية الاعتقاد الجامعي - تنفي دراسية

هذا الفنّ جميع المعلومات عن إنتاج برامج التربية الغذائية من مراكز محققة الموسيقى

cالدهوة والانتماءات الصحية - العدد الكلي لهذه الفئة 20 مثالية تطبيق بعدن نصيب 7

مراكز محققة الموسيقى -

ص 24 نعم تتطلب إعداد التربية الغذائية ـ شعبة شعبة: شعبة النشاط

المذكورة - شعبة المطبخ شعبة: شعبة النشاط الآoltaية جمعية الخرطوم

وكلية الاعتقاد الجامعي - وتكملها dünya التدريبي وزارة الصحة وزارحة التعليم - العدد الكلي

لرئة الفئة 42

مع نيت فراعنة هذه النتائج من طرق الإعلان المباشر لدور النشاط في التعبير عن طريقة

الدردشة والنشاطات المختلفة كما استعملت: طريقة الملاحظات في مراكز محققة الموسيقى، وفي

تحديد الإجابات.

المعلومات التي تمت استخراجها في تقديم المعلومات اللازمة لاعداد البرنامج كما استعملت

في مختبر المطبخ الصحي، مما في ذلك: سريع الثقافة والمصادر الإعلامية. وتقسيم الإرشادات لiveness،

نالت الذكرى وفوق جبن من خلال المتعارف الإرشادات الثقافية اختفاء تمكنت نصائح النبالة.

وتمت لبناء م процامل المختبر الثقافي، بينما نتائج المرحلة الأولى وتشمل:

نظام وتقسيم بين محاكاة التربية الغذائية ونواحي التربية الغذائية بالترشيح الغذائية اهداف

تارت، في ما يمتزح الميدان في الوضع والأرجح. لن يتم ترميم هذه الإحداث مع رسم

مصفحة، وتحية خطة عمل المرحلة،
· هناك نقاط جادة وقدنام في بعض مراكز جهة الأموات مثيل الدراسي الوصاعل السائدة لنموذج التعليمات ولذا نقدم الخبرات النظيفة للإدارات في شكل توجيهات وتعليمات في موازنة أو تنفيذ.

· اتخاذ التربوية الثقافية لا يتجزأ في تنسيق وتسويق المناهج التعليمية.

· لا يوجد سلسلة تعليمية واحدة أو مجلس له للتنظيم والتسليط بين الجوانب المختلفة، التي تقدم في مناهج التعليم في التربية الثقافية مثل وزراء الصحة، التربية والتعليم، الزراعة والمناعة.

· السمات النموذجية والتعليمية المحددة والفلسفية والآداب والصحة تقوم بها وزراء التعليم والصحة ما أن تكون مقدرا لفهم التربية الثقافية وما أن تحتاج إلى تطبيق. فان نظام التعليم الأحرار يحقق النوعية في تغيير اعتمادات القلوب في هذا النوع من الخريجات.

· لا يوجد سلسلة منفصلة لمراحل التربية الثقافية.

· كنا أيها المدارس جدول ومن المعلم حسب تطبيق برنامج التربية الثقافية.

· التربية الثقافية تتطلب تحقيق جدول المسؤولية ورضا الدورين يوجد في تنمية الخلايا الإبداعية ويساهم في تعليم هذه المناهج في أماكن تواجد المدارس والطلاب مثل مراكز الصحة الإدارية ومركز التأهيل الثقفي.

· الاحساسات التقنية ليس منها فئة من المناهج أو التخصصات الثقافية للفرد أو الأمة.

· البحث في قطاعات الاجتماعية والثقافية يتحى وحد مابلي.

· وجود مشاكل حقيقية مثل الأذى بالأكليات - الاستغلال والطباليات - عند 20% من المبتدئين.

· رأس مال حالي.

· الأبرز، السمنة، التحرش، الكرة، السمن، التحرش، الأموت، الأموت، التحرش.

· الدولة المستخدمة بترخيص هذا الأوزان مابلي، إلى علاج داخلي مابلي.
لا يوجد نص يمكن قراءته بشكل طبيعي من الصورة المقدمة.
- تحسين وتسهيل الإعداد.
- خرائط غذائية.
- تنظيم الخزائن وتنظيم المواد الغذائية بناءً على الفترة الزمنية.
- الرغبات والاحتياجات الفردية للطعام وشروط الطهي الطبيعية.
- هما جزء من نظام غذائي صحي ومغذي.

في نهاية البيئة تحديث درجات مراقبة:

السرعة الغذائية يمكن أن تكون جزء من طرق التغذية الصحية.

كما يجب أن تتفق الفئات الغذائية لنظام نظيف من الديدان الغذائية.

الخضروات يجب أن تكون جزءًا من نظام غذائي صحي مع نظام معين من الخضروات الصحية.

لذا يجب أن يتم التوقيت المناسب للخضروات الصحية مع نظام معين من الخضروات الصحية.

كما يجب أن يتم تدوين جزء من نظام غذائي صحي مع نظام معين من الخضروات الصحية.

الخضروات الصحية تلعب دورًا مهمًا في نظام غذائي صحي مع نظام معين من الخضروات الصحية.

كما يجب أن يتم تدوين جزء من نظام غذائي صحي مع نظام معين من الخضروات الصحية.

الخضروات الصحية تلعب دورًا مهمًا في نظام غذائي صحي مع نظام معين من الخضروات الصحية.

كما يجب أن يتم تدوين جزء من نظام غذائي صحي مع نظام معين من الخضروات الصحية.

الخضروات الصحية تلعب دورًا مهمًا في نظام غذائي صحي مع نظام معين من الخضروات الصحية.

كما يجب أن يتم تدوين جزء من نظام غذائي صحي مع نظام معين من الخضروات الصحية.

الخضروات الصحية تلعب دورًا مهمًا في نظام غذائي صحي مع نظام معين من الخضروات الصحية.