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THE ROLE OF NUTRITION EDUCATION ON THE FACTORS INFLUENCING CHILDHOOD NUTRITION IN NIGERIA

By

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ABSTRACT

THE ROLE OF NUTRITION EDUCATION ON THE FACTORS INFLUENCING CHILDHOOD NUTRITION IN NIGERIA

By

Maureen Menta Scott-Emuakpor

A study of the factors that influence malnutrition in Nigeria has been carried out. Emphasis was placed on the possible role of education as well as on childhood malnutrition. This study was conducted in Benin City by means of well-tested questionnaires and, interviews with individual subjects. The study group comprised of 1056 mothers (15 to 45 years old) with two or more children, 7 primary schools, 15 secondary schools, 3 nursing schools and 4 government ministries. This investigation was mostly an effort aimed at providing appropriate baseline information to aid the fight against childhood malnutrition in Nigeria.

The questionnaires were designed to highlight the role that nutrition education can be made to play in the prevention of undernutrition and diseases of malnutrition in Nigeria. Several hypotheses were tested, the results of which led to the conclusion that:

(a) the lower the education of the mother, the lower her knowledge of nutrition.

(b) the older the mother, the lower her level of

nutrition knowledge.

(c) the higher the educational level of the father, the more involved and interested he is in the total nutrition of his child.

Also concluded are:

(a) the major source of nutrition information for the mothers is hospital nurses.

(b) the curricula of primary and secondary schools are grossly deficient in nutrition courses.

(c) nursing schools nutrition programs are so trivial that they do not adequately prepare the nurse for the delivery of sound nutrition information to the patients she serves.

An examination of government nutrition programs revealed that:

(a) there is a pathetic lack of good programs to serve the masses.

(b) the programs that exist lack proper publicity.

(c) there is an enormous waste in terms of manpower because of serious overlaps, resulting from poor coordination in the functions of various government agencies involved in nutrition. Thus, government efforts to combat malnutrition are profoundly handicapped.

This study concluded that with proper education, both

at the adult level (non-formal) and at the level of schools (formal), the most important cause of malnutrition in Nigeria can be eliminated. Suggestions as to ways of improving the quality of nutrition education, in general, were made. Also, suggestions were made as to how government can improve its programs so as to be effective in combating childhood malnutrition in the country.

DEDICATION

To the memory of my father

KPEDE D. MENTA

whose dogged refusal to yield to pressures,
not to give his daughters formal education,
made this possible.

and

To the memory of my son

MUDIAGA P. SCOTT-EMUAKPOR

who, in three short years of life, taught me
the true meaning of joy, love, sorrow and faith.

and

To the memory of my brother

TIVE H. MENTA

who taught me the meaning and joy of having a
united family with a sense of belongingness.

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Very special thanks are due to my husband, Dr. Ajovi B. Scott-Emuakpor, who has been the primary motivator in my educational pursuits, and who, throuth the years, has taught me the value of continually striving to better understand myself and the world at large with joy; and

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Chapter 1

INTRODUCTION

This study was carried out in Nigeria, which is the most populous country in Black Africa. The population of Nigeria by the 1963 Census was 55,670,000 and the projected population for 1976 at a 2½% rate of growth was approximately 77,435,000 (59). The population for Bendel (then Mid-west) State by the 1963 Census was 2,535,839, and for Benin City it was 100,694 but the estimated population of this city in 1975 was 136,000 (1).

Benin City in Bendel State of Nigeria was an ideal place for this study because its population comprised individuals representing almost every cultural group in Nigeria. Only few other Nigerian cities have this uniqueness. Therefore, the data collected has general applicability to Nigeria.

Nutrition has always been an "over-looked" subject in many African countries. However, in Nigeria, concern for the poor nutritional state of children has grown tremendously in recent years. This is, probably, due to an increase in the proportion of children with the diseases of malnutrition. This increase is apparently

due to inflation, high population growth, and little or no increase in food production. There might also be a slight increase in public awareness because of the activities of the few nutrition education programes which currently exist in the country. For instance, some time in 1976, a two week nutrition course was concluded in Sokoto, Nigeria, during which time, the Chief Medical Officer for Sokoto State, Dr. Shah, stressed the importance of Nutrition Education (76). A day before the above publication came out, the same paper (Nigerian Observer, which is a local newspaper) published a statement by the Oyo State Commissioner for Health, Dr. Atanda, which sketchily outlined the causes of malnutrition (16). In that statement, Dr. Atanda was quoted as saying that 70% of the children between the ages of one and four years old suffer from varying degrees of malnutrition in the developing countries of the world.

It is apparent that no acceptable definite, or even approximate figure of malnutrition exists for Bendel State nor for the whole of Nigeria. Another newspaper, in an article captioned, "Alarm on Malnutrition" quoted the Director of Food Science and Applied Nutrition Unit of the University of Ibadan, Professor Omololu, as calling for an increase in "personnel in the field of nutrition to teach nutrition education especially in the (UPE) universal primary education scheme" (6).

From the foregoing, there is little doubt that Nigeria is prepared for a comprehensive study of the factors that influence childhood nutrition and the ways by which the nutritional status of all children can be improved. With the introduction of the Universal Primary Education (UPE) policy of the Federal Government which commenced in September of 1976, the need to carry out this study became more urgent. Nigeria can not afford to have the UPE when 70% of all the children, for whom the scheme is designed, have suffered from some malnutrition early in life which, no doubt, affected proper mental development. It will certainly be self-defeating if a high proportion of these children are not educable.

In order to stress the importance of Nutrition Education in an attempt to solve the enormous problem of malnutrition in Nigeria, it is essential to define the principles of Nutrition Education. In doing this, the investigator chose to refer to the statement prepared by a Study Group on Nutrition at the VIIth International Conference on Health that met in Buenos Aires, Argentina in 1969 (80). The statement is summarized below:

(a) Health education itself is incomplete without nutrition education.

(b) For positive results, nutrition education should be integrated into the government policy plans. This will help to achieve higher economic and social development

(c) There should be unified norms and concepts of nutrition education in order to reduce the state of confusion in nutrition education.

(d) Coordination of nutrition education programs at the planning, implementation, and evaluation levels, is essential.

(e) The educational techniques to be used must be based on the cultural, socio-economic and family meal patterns of the target population as well as the available foods in the community.

For people in Nigeria to achieve a reasonably high level of nutrition for their children through the efforts of Nutrition Education, the masses must be made to be aware of the importance of adequate nutrition to the family and the means available for attaining it (63). There must also be a clear knowledge of the various foods that are available and their nutritional value. The population must know the optimum conditions for storing foods under local conditions. They must know what the contaminants of foods are. The task must be a coordinated effort between the different planning sectors concerned with food, namely, Nutritionists, Health Personnel, Educators, Economists, Agriculturists, Biochemists and Microbiologists, Politicians, and others.

For more than three decades now, there has been a heart warming concern about the plight of the hungry the world over. Well-meaning individuals and developed

countries have shifted their humanitarian concerns from hunger occasioned by disasters to the general conditions of perennial undernourishment with which a huge proportion of mankind has had to contend. This has given impetus to various people, countries and international and national organizations to try to define the problems of under-nutrition and malnutrition and, also, to find practical solutions that would help alleviate the problems. This research was conceived and designed as a form of practical solution.

In 1968 during a West African Conference on Nutrition and Child Feeding, Johnson (43), while giving the report on Nutrition in Nigeria, outlined six major problems inhibiting programs to combat malnutrition. These include:

(a) Poverty.

(b) Inadequate food production due to a variety of reasons.

(c) Poor storage.

(d) Inadequate food intake.

(e) Wrong choice of foods.

(f) Wrong preparation of foods.

An examination of these six reasons will show that more than half of the obstacles could have been avoided had there been adequate Nutrition Education programs. Omololu (64), talking on Nutrition and Education during the same conference, gave similar reasons for the

inadequacy of calories in Nigeria. In concluding his views, he said,

> "Improvement of nutrition in our countries is not only the preserve of nutrition: all the other disciplines...agriculture, education, health, marketing, cooperatives, home economics, and voluntary organizations...must be brought in; and NUTRITION EDUCATION OF ALL OF THESE GROUPS OF PEOPLE IS THE KEYNOTE OF SOUND NUTRITION POLICY AND SOUND NUTRITION PRACTICE" (added by the researcher).

What is most striking about the situation is that, inspite of numerous and repeated strong statements such as that quoted above, by individuals in positions to know the importance of mass education on nutritional improvement, no real scientific effort has been made to document the fact that one of the most important tools for combating undernutrition and malnutrition is adequate education. Consequently, comments by well-meaning people in this regard, have been looked at as mere untested opinions. This research was, therefore, designed to provide a scientific basis for understanding the role of Nutrition Education in the proper nutrition of our people, particularly the children upon whom the burden of our lack of education is most profound (see Appendix A for copy of proposal).

Objectives and Purpose of the Study

There are eight major objectives of this study.

(a) To examine the current state of understanding that Nigerian mothers have about the proper

nutrition of their children; and how a child is to be fed and nourished.

(b) To determine the sources from which mothers get information regarding the proper feeding of their children; and to determine the relative role played by physicians, nurses, relations, friends, booklet advertisements, TV and radio, about infant nutrition.

(c) To examine and evaluate the impressions that Nigerian mothers have about breast-feeding (factors that determine length of time of breast-feeding and weaning).

(d) To determine how many mothers feed their children commercial formulae, and how many mothers have knowledge of their nutrient content.

(e) To determine whether or not Nigerian mothers consider protein foods as food, per se.

(f) To determine what roles husbands play in infant nutrition.

(g) To postulate methods of improving public awareness of the poor nutritional state of the masses of the children; and also, to postulate methods of improving public awareness of the nutrition education programs available in the country.

(h) To postulate the role that adult education programs can play in improving the nutritional state of Nigerian children.

The purpose of this investigation can be said to be four-fold: first, to find out the educational level of mothers as related to their level of nutritional knowledge; secondly, to find out the major sources of information on infant nutrition and the mothers' attitudes toward breast-feeding; thirdly, to find out the degree of the interest fathers have on the nutrition of their children; and fourthly, to find out how these three variables combine to influence childhood nutrition in Bendel State and the whole of Nigeria.

It was of interest to note that several research efforts have been made in the area of applied nutrition in Nigeria. In this regard, scientific papers exist, published in learned journals on the nutritional values and contents of various Nigerian foods, the factors that influence proper nutrition, relationship between cultural beliefs and proper nutrition, etc. A criticism often levelled against academic people, which is not without justification, is that communication of research results are often confined to conferences, symposia and scientific journals. Apart from serving the professional needs of these researchers to further their academic progress and to satisfy their intellectual curiousities, these studies are worthless as far as the people are concerned. Because of their awareness which was emphasized by Professor Olayide (62), this study has also attempted to define the role that extension services can play along with Adult

Education in finding meaningful solutions to the problem of nutrition.

The material to be reported here, is in the broad area of Nutrition Education, which has become an academic entity by itself. Consequently, the language of Nutrition Education has become rather specialized and, in some cases, technical. It would, therefore, be essential to define some of the terms used in this dissertation at this stage to provide the reader with a clear understanding of the subject matter.

Terminologies

Education: is "the process of equipping people with certain attitudes and skills which can lead to behavior or action... It is a life-long process in any society" (32).

Adult Education: is the teaching of matured persons as opposed to children. This can further be defined in many ways. For the purpose of this dissertation, the UNESCO definition will be used:

> "for a large num-er of adults in the world today, it is a substitute for the basic education they missed. For the many individuals who received only a very incomplete education, it is the completement to elementary or progressional education. For those whom it helps respond to new demands which their environment makes on them, it is the prolongation of education. It offers further education to those who have already receive high level training" (85).

Also, adult education helps to improve deficiencies of previous or earlier education in

order for the individual to be able to keep pace with rapidly changing social order.

Adult Educator: is an adult who carries out the art of teaching adults.

Basic Education: is primary school and/or secondary school education.

Continuing Education: is the type of education that gives "further direction in building a solid foundation for future development, achievement and advancement" (39). This type of education is functional in that it becomes a tool by which the individual who possesses it, advances himself, his family, his country and the world as a whole.

Non-formal Education: There are several learning activities outside the formal learning institutions. These activities can be described as "non-formal;" they are meant to provide education to persons who, for several different reasons, cannot be enrolled in formal educational institutions. Hence, non-formal education includes learning activities which lie outside the primary, secondary, post-secondary and higher educational institutions such as the university.

Informal Education: is education in any non-formal physical school setting.

Nutrition: is the science of the function of food as related to both healthy and sick bodies. This science is highly related to the biochemistry and physiology of the body.

Nutrition Education: involves any coordinated nutrition activities between ministries of health, education, agriculture and local government, with schools and other related agencies for the purpose of imparting nutrition knowledge to all persons in the community and thereby raising the levels of nutrition among family members and the entire population of the community. Also, according to Todhunter, nutrition education:

> "is the process by which beliefs, attitudes and understandings about food lead to habits that are nutritionally sound, practical, and consistent with individual needs and available food resources" (82).

Nutrition Activities: involves any activities carried out for the purpose of improving the nutritional status of the people.

Extension Service: is a part of a major service or activities given by a large institution or organization such as the ministries. These activities are directed toward a specific group of individuals with the aim of delivering some essential services or assistance. Such

services or assistance could be as a single extension service program or a combination of such services or assistance as educational, financial, managerial, technical, etc.

Malnutrition: is a condition in which the diet may provide the body's energy needs or excess of it, and at the same time the diet does not provide the other essential nutrients (protein, vitamins and minerals) which the body requires for proper development and growth.

Undernutrition: is a condition which occurs when there is not enough food in terms of quantity to supply the body's energy needs.

Protein-calorie Malnutrition (Kwashiorkor): is childhood malnutrition produced by a diet low in protein and moderately high in calories.

Marasmus: is childhood malnutrition produced by a diet low in both protein and calories, i.e., a diet which does not provide for the body's energy needs.

Food Stamp: for this study, it is paper money of different denominations of the Naira, which low income families can buy from the government at reduced rate, e.g., one hundred Naira worth of food stamps could be bought for, say, seventy-five Naira.

Educational Level: is the number of years of schooling beyond the primary school level. This refers to the range of formal educational attainment (i.e., from no formal schooling at all, to university education).

Nutritional Knowledge: is the knowledge of the nutrient values of available foods and baby formula nutrient content; also, whether or not protein is considered food for better growth or just a type of necessary "condiment" that makes meals taste better.

Father's Interest in Feeding: involves interest in the mere filling up of the child's stomach with any food item (usually high carbohydrate foods).

Father's Interest in Nutrition: involves interest in the types and combinations of foods fed to his children for better nourishment to the children.

Overview

In Chapter I, the problem, its importance, definitions of terminologies, and theory have been stated. In Chapter II, the pertinent literature covering aspects of nutrition education in Africa and developing countries, as well as aspects of the problem of malnutrition in these areas are reviewed.

In Chapter III, the design of the study, the population and sample, the variables, the hypotheses, and the methods of analyses are presented. In Chapter IV, the results are presented and analyzed. In Chapter V, the conclusions derived from the study, discussion, and implications are given. Also given in this Chapter, are some suggestions for improving nutrition education in Nigeria. The appendices include a copy of the research proposal and questionnaires utilized during the data gathering process.

Chapter II

REVIEW OF RELATED LITERATURE

Food and nutrition have always been part of mankind's history. Whole populations and even civilizations have been wiped out by famine. Battles are known to have been postponed until after harvest and, in countless instances, well-fed armies have prevailed over the under-fed ones (65). Historians have written extensively on the effects that nutrition had on the outcome of the Nigerian civil war of 1967 to 1970 (5,22,72).

Some of the most significant accomplishments of man in his struggle for survival have been closely associated with nutrition. The discovery of fire is probably the single most important event in man's history and this discovery was to improve his food technology and hence, his nutrition. The subject of nutrition education is, therefore, as old as man himself.

Nutrition education is considered to be an art and science which is expected to begin as soon as the child is born (48). But many parents themselves, who are supposed to take up this role of nutrition education as

soon as the child is born, lack basic knowledge of nutrition.

The existing literature on nutrition and education is not particularly helpful in providing wider insight into the question of the role of education on the factors affecting childhood nutrition in Nigeria.

Extent of Childhood Malnutrition Especially in Developing Countries

Studies have shown that contacts with foods early in life, do influence food acceptance and selection later in life (77,78). It, therefore, stands to reason that poor childhood nutrition has an effect on adult nutritional habits. Several studies have been carried out all over the world which give different reasons as causes of malnutrition. These reasons have cultural, social, psychological, and economic base. For instance, in Central America and in the Far East, the incidence of malnutrition and death is high among preschool children because high protein foods such as meat, fish, eggs and also many fruits and vegetables are believed to be harmful for young children; in Bantu families, girls of child-bearing age are forbidden to drink milk because it is believed to cause infertility in females; in Tunisia, mothers exchange eggs laid by their hens for tea and sugar for their children (29). Also, in many African cultures, it is very common to find a system of priority within

families which gives the father the first chance on available food. The mother comes next and the children last (57). The action comes not from any lack of affection or love for their children, but from lack of education. Indeed, great importance is attached to bearing and rearing large numbers of children. Therefore, fertility is of great importance in African societies. Consequently, most food taboos or habits have their origin in fertility (73).

According to all indications from contemporary research, inadequate nutrition can prevent a child from reaching his full hereditary potential, not only in terms of physical size and strength, but also in terms of cognitive development as well. The work of Mitchell (53) showed clearly that when the nutritional needs of the adolescent are not met, stature potential is not realized. Thus, the food which provides nutrients required for physical growth is a very essential factor for general growth and development and the process of feeding a baby does play a significant role in psychosocial development, such as feeling of security, love, affection and attachment.

The problems of malnutrition are not restricted to a particular group of people or to specific geographical areas; they exist all over the world and even in such developed or technologically advanced countries as the United States of America (U.S.A.) for the same reasons that they exist in developing countries. Mehren (51),

referring to the U.S.A. said,

> "Malnutrition in this country is due not only to poverty. Poor choice of food due to ignorance, faulty information and the simple lack of appreciation of the relationship existing between good nutrition and the health and well-being of the individual are general causes in all ages and all geographical areas, and in different...economic levels."

Related Studies on Nutrition and Education

Considerable attention has been given to child nutrition as well as to nutrition education in several developing countries, including Latin America and India (17,18,30,40). This attention has led to investigative efforts, only a few of which have been carried out in the area of Nutrition Education. Many studies in Nigeria have revealed that there is a decline in the nutritional content, particularly protein of breast milk, with prolonged lactation. It is also known that solid foods (usually comprised of low protein and high carbohydrate) are introduced to the infant late. Thus, towards the end of lactation (weaning period), the child experiences a crucial shortage of essential nutrition, a situation which could be avoided with adequate nutrition education (4,37,42,54,60).

Income, Nutrition Education and Food and Nutrition Policies as Related to Economic Development

Although poverty has been found to be a contributing factor to malnutrition in general, several studies have shown that increase in income to raise an individual from the poverty level does not necessarily ensure better nutrition (11,12).

Even in the so called developed countries such as the U.S.A., it has been found that persons are malnourished more because of nutritional ignorance than because of poverty (50).

When talking of national development, education is a factor that cannot be overlooked; it is an indispensable factor in national development. Education has a very important role to play in the biology of the individual and the society as a whole. As explained by Griffin and Light (35), "education can design and program the transfer of knowledge and relevant behaviors required for the continuing health and progress of society."

It is well known that;

> "the quickest way to increase productivity in Africa today, in any industry, is by on-the-job training of adult workers. This form of education is the most closely geared to economic development, and yet the most neglected" (84).

Although, poorly appreciated, nutrition is one of the key factors in national development. Economic growth is development and it depends largely on the existence of able human beings. If nutrition of the human being is not

considered a priority in national development, then such development could become stunted.

In-service nutrition education for elementary teachers has been found to be useful in the nutrition education of elementary school children. Such in-service training has been carried out in many parts of the world including such developed countries as the U.S.A. (15,79), and has been found to be useful and helpful in the nutrition education of primary school children. This aspect of nutrition education is found to be so important in the U.S.A. that attempts are made to reach as many elementary school teachers as possible. An example of one attempt made to reach more teachers is the use of a telephone circuit from Kansas State University, connecting about seventeen sites throughout the entire state of Kansas, to teach nutrition courses to elementary school teachers (86).

Although, foods and nutrition courses have been officially introduced into the curriculum of primary and secondary schools for the whole of Nigeria, the subject has not been adequately taught in the schools due to the unavailability of teachers in nutrition. Experiences gained from many other parts of the world showed that the teaching of nutrition in elementary schools has been found to improve nutritional habits of elementary school children (10,19,38).

Nutrition Education in Medical and Nursing Schools

As recently as 1970, reports by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) experts revealed that nutrition is not adequately taught in medical and paramedical schools (44). Nutrition education in medical and nursing schools, especially in developing countries, has been found to be deficient in both content and method. Curriculum of these schools lack nutrition as a component (45).

In disciplines as important and humanitarian as the health professions, one would have expected that nutrition would be given enormous emphasis in developing countries, because a huge percentage of the diseases the profession has to deal with are nutritional in origin. Because of their special position in the society, their role in educating their patients on the importance of proper nutrition cannot be over-emphasized. Without an adequate knowledge of basic nutrition, resulting from a deficient school curriculum, their responsibilities to their patients appear incomplete.

The disregard or lack of appreciation that medical professions have for nutrition is not found only in Nigeria; it is a world-wide practice. For instance, in the U.S.A. nutrition in nursing schools seem to be receiving less attention (28,56).

Nutrition Education as a Means of Eliminating Childhood Malnutrition

At the joint FAO/UNESCO/WHO meeting on the role of the teacher in teaching food and nutrition (66), it was stated that:

> "although the solution of the problems of nutrition depends to a large extent on the solid economic and agricultural development of the country and the quantity and quality of the food available at reasonable prices, it has been generally recognized that food habits and cultural patterns also influence nutrition. It has been shown that in many places in the world, malnutrition is the result of ignorance and prejudices rather than of poverty and shortage of food."

To emphasize this point further, Marcel Autret indicated in Ritchie's book that,

> "Ignorance is the ally of hunger. Together with poverty, which it often accompanies, it is basically responsible for virtually every case of malnutrition" (67).

From the investigator's experience, although most of the world's hunger and malnutrition is caused by traditional beliefs and practices, inefficient food production and distribution within individual nations and families, lack of knowledge of nutrition appears to be a more direct cause in a large percentage of cases. To be able to control malnutrition, adults or parents must understand what the basic principles of nutrition are and, the individual nutritional needs of the family members - the young child, the pregnant and lactating mothers, etc.; also, they must know how to make good food choices based on their limited family income.

Malnutrition is common in many African countries and, in many of these countries, education has been proposed as one important means of combating malnutrition. In Tanzania, according to Semiti, "to combat malnutrition, we are placing great reliance on education, and...it should be possible to make much progress in this way" (75). Giving a report on Nutrition in Gambia, Fuller remarked (33), "the main aim for the future [to combat malnutrition] would seem to be more education - in the schools, in mixed farming centers, and at the clinics" brackets are mine . Ofosu-Amaah, speaking for Ghana, identified "ignorance, harmful beliefs, the general level of education, and individual poverty" as major problems inhibiting efforts to combat malnutrition and, among his four major plans to solve the problem is "intensive Nutrition Education" (61). Speaking for Uganda, Muyanga stated (55), "The task ahead is to intensify our Nutrition Education to reach that section of the people who need it most." There is no question that nutrition education is considered a very significant factor in the efforts to combat malnutrition.

According to the United Nations Declaration of Human Rights (87), every body has the right to sufficient and proper food. However, in order to attain this right, nutrition education, by any means, is required to enable any individual, any population or community to be properly nourished.

Nutrition education is a need that has been relatively newly recognized all over the world. In order for man to make good choices of what he needs to eat, he has to have some form of nutrition education; making good food choices is not something in-born in man - it has to be learned.

It has been shown that both fathers and mothers are influential in food selection and meal planning for the family (27). Therefore, their choices of foods which, in the first place were made out of ignorance in most cases, are passed on to their children and their children's children; thus, perpetuating the same basic problem.

The success of nutrition education in improving the nutritional status of individuals has been investigated in several places. In the U.S.A. a study was carried out among summer camp children during which time they were given some nutrition education in order to increase their vegetable consumption. It was noted that these children had a significantly higher demand for vegetables than a control group and thus had a higher vegetable consumption (7).

It has been shown also that there is a direct relationship between nutrition knowledge and the level of general education, not only in developing countries like Nigeria (74), but also in developed ones like the U.S.A. (27). Other studies have shown that mothers who have knowledge of nutrition are more likely to serve

nutritionally adequate diets to their families. For instance, a study of homemakers in Richmond, Virginia (in the U.S.A.) showed that 60% of the homemakers who had some knowledge of nutrition were able to provide their families with adequate diets (26,88).

In spite of the extensive public pronouncements and the various academic articles that have been published on the subject of nutrition education in Nigeria during the past few years, there has been very little response in the direction of improving the nutritional status of the people of Nigeria. The reasons for this poor response have been very well outlined by Professor Olayide of the Department of Agricultural Economics and Extension of the University of Ibadan (62). These reasons are:

(a) "The imprecise definition of the scope and meaning of nutrition training and its implications for accelerated economic development.
(b) The inadequacy of the existing extension organization to cope with demands of a dynamic nutrition training in terms of organization, personnel, material and money.
(c) The lack of an articulated plan of programs on nutrition training for which adequate logistics have to be provided or mobilized for meaningful implementation."

These three points advanced by Professor Olayide, seem to emphasize the degree of difficulty that nutritionists have in Nigeria. How can one clearly define the scope and meaning of nutrition training when there is no understanding of what governs the food habits of the people in Nigeria and what factors influence their choice of

available food resources! How can a country cope with the immense extension facilities that a dynamic nutrition training program demands, when the relative influence which the various health personnel have on the Nigerian mother is not known! An articulated nutrition education program can only exist if methods are available for improving the nutrition of children in Nigeria.

What is Childhood Malnutrition?

Kwashiorkor and marasmus are two major malnutrition diseases of childhood well recognized all over the world, especially in the tropical areas of the world (49). Protein-calorie malnutrition (PCM), which is referred to as kwashiorkor, is the most widespread childhood nutritional disease found in developing countries. It is found to be an important cause of child mortality and morbidity, resulting in permanent damage to physical and mental growth among children who survive (31).

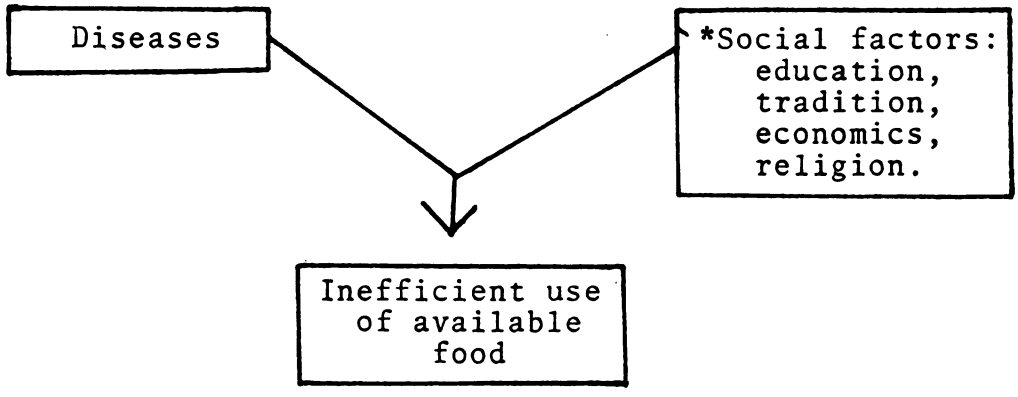
In many developing countries, kwashiorkor seems to be a disease of the infant that has been newly weaned from breast milk (14). For this reason, the weaning period is a very crucial one for Nigerian children. In fact, there is evidence that the processes of malnutrition in these children began much earlier in life. According to the Ninth Report of the FAO/WHO Expert Committee on Nutrition,

> "at about 5 to 6 months of age, breast feeding is no longer adequate to meet the infant's nutritional needs. From this time until about

> 3 years of age, when the child can join the family in eating the ordinary family diet, special infant foods are required" (31).

In many developing countries, these special infant foods, mentioned in the report above, are not readily available to the people who need them most. Consequently, infants are fed on available foods, which in most cases are wrong foods for reasons described earlier.

Several factors have been said to be responsible for malnutrition. This is presented graphically in Figure 1.



*Some social factors, traditions and religious beliefs can be eliminated by adequate nutrition education.

Figure 1: Education as a fraction of causes of malnutrition (adapted from Runyan, Nutrition for Today, p. 134) (68)

Kwashiorkor is present mainly in places where educational, socio-economic and cultural factors combine to make sufficient protein unavailable to the child. From an educational standpoint, studies have shown that kwashiorkor is seen more among children of parents with some elementary school education or less than secondary (high) school education (74). From an economic

standpoint, this disease appears to be greater in rural families with no steady income than in wage-earning families (14). From a cultural standpoint, Nicol showed that in rural Nigeria, kwashiorkor is higher in areas where the staple foods are starchy tubers, like yams and cassava, than in areas where such cereals as sorghum and millet constitute a major part of the diet (58).

Extent of Childhood Malnutrition, Especially in Developing Countries

Childhood malnutrition is a world-wide problem especially in developing countries; and studies in many of these countries have shown that childhood malnutrition is the greatest contributor to child mortality (13). In India, children under five years old account for 65% of all deaths; in Brazil it is 80% of all deaths; and in Egypt it is 68% of all deaths (13). Also, in such developing countries as in Asia, Africa, and Latin America, a large number of children are malnourished (36); and many of these children will die before they reach school age; and those of them who survive may be handicapped for life.

One hundred and one community surveys were carried out among 59 developing countries in the period of ten years (1961 to 1971); and results of these surveys show that not less than 100 million children under the age of 5 years are affected by moderate to severe PCM (31).

Although precise quantitative information is lacking, there is reason to believe that as much as 70% of all children in Nigeria suffer from some form of malnutrition at some time in their childhood. According to the Ninth Report of the Joint FAO/WHO Expert Committee on Nutrition (31),

> "malnutrition is an especially important, though often hidden, cause of mortality among children. There is a high incidence of infectious diseases among young children in most developing countries and the resultant high morbidity and mortality is largely due to lowered body resistance because of malnutrition... The existence of malnutrition on any scale should be cause for concern. The present and projected magnitude of the problem calls for the most urgent consideration of the means for its elimination."

Prevention and Treatment of Childhood Malnutrition

Malnutrition is known to have existed even in prehistoric times (35) but was not known to be associated with food, hence, it could not be treated. Therefore, to prevent malnutrition, we must have knowledge of how to apply principles of nutrition to food selection in order to be in good nutritional status.

For effective treatment of kwashiorkor, therefore, it is important to know (apart from other information and medical treatment given to the child) the educational background of the parents in terms of how much nutrition they know. This will help to outline how much nutrition education to be given to the parents to prevent recurrence

of malnutrition in the child or subsequent children in the family. This task of combating childhood malnutrition is very important because early childhood malnutrition can lead to permanent psychological and organic damage which in turn will lead to negative social and emotional behavior as well as biological retardation. Many studies have shown that kwashiorkor in early childhood does have negative effect on the physical and physiological development of the child; and inadequate nutrition in infancy has been found to give rise to brain damage which may be permanent (2,3,20,25,47,52,81).

Just as an individual with a hungry stomach will find it difficult to function adequately, so also will a malnourished child. His curiousity and ability to concentrate are impaired by malnutrition; he looks physically and emotionally exhausted, and teachers who have no knowledge of symptoms of malnutrition may feel that such a child is not interested in coming to school. Such a child may end up dropping out of school or spending more years in school.

There is no doubt that a consensus of opinion that poor or improper education is a major contributing factor to the deplorable nutritional status of the children of Nigeria. True, there are economic reasons as well as cultural and social reasons (8,34,41,46,71,73,83) for poor nutrition, but with proper education, the effects that these factors have on nutrition could be reduced.

In summary, the literature has pointed out that:

(a) Nutrition has always been part of mankind's history; and childhood malnutrition is recognized all over the world.

(b) Childhood malnutrition, especially in developing countries, has been influenced by several factors which have cultural, social, psychological and economic basic factors.

(c) Nutrition education is being recognized all over the world.

(d) Although poverty is a factor contributing to malnutrition, increased income does not ensure better nutrition; but that nutrition education ensures better nutrition for the individual as well as for the family.

(e) There is direct relationship between nutrition knowledge and the level of general education of individuals.

(f) Nutrition is a recognized key factor in national development, even though it is poorly appreciated.

(g) In-service nutrition education of teachers is useful in nutrition education of school children.

(h) Nutrition education in medical and nursing schools is receiving less attention.

(i) Nutrition education, in general, has been found to be a major means of reducing childhood malnutrition.

(j) Childhood malnutrition has negative effect on the physical, physiological, and emotional development of the child.

Chapter III

DESIGN OF THE STUDY

The study was designed to evaluate the relationship between the level of formal education and knowledge of nutrition on the one hand, and between knowledge of nutrition and the prevention of malnutrition on the other. This relationship was evaluated for the mother and; for the father, the relationship between level of education and concern for their children's nutrition was evaluated. Thus, the relative influence that each parent has on the nutrition of their children was examined. Also evaluated were sources from which education about proper nutrition was received by the population and the magnitude of influence that each of the sources has on nutrition. This latter was with a view to finding out which educational source is most effective in teaching the masses about the meaning and usefulness of proper nutriton. Hence, there are eight major hypotheses tested:

(a) The lower the educational level of the mother, the lower the nutritional knowledge that she has.

(b) The older the mother, the lower the level of nutritional knowledge that she has.

(c) The higher the educational level of the father, the more interest he has in the nutrition of his child as against the feeding of his child.

(d) The major reason for breast-feeding is the belief of the natural nourishment it provides the child.

(e) A major source of information on infant nutrition is hospital nurses.

(f) The curricula of both primary and secondary schools in Nigeria have played no active role in nutrition education and have thus, contributed to childhood malnutrition.

(g) There is little or no nutrition education in nursing schools in Nigeria, thus, making the nurse ill-equipped to help prevent childhood malnutrition.

(h) Lack of publicity and coordination of the nutrition education programs presently in existence are handicaps to the efforts of government to combat malnutrition.

Population and Sample Description

The study was conducted in Benin City, Bendel State of Nigeria. Because the population of Benin City (1) represents almost every cultural group in Nigeria, the findings are applicable to Nigeria as a whole. Benin City, a major city in Nigeria (1) is also a cosmopolitan

area and the State's capital to which all nutrition and/or medically related cases are referred. Thus, it serves as the "Receiving Station" for Bendel State, and is very rich in terms of an adequate and appropriate population for this investigation.

The sample for this study was made up of three sets. These are:

(a) One thousand and fifty six mothers who have had, at least, two children and fed them within the country during their infancy and childhood period.

(b) Twenty five schools (seven primary, fifteen secondary and three nursing).

(c) Four government ministries (Agriculture, Education, Health, and Local government).

Mothers were randomly selected in hospitals, and in the ministry of health nutrition unit and the health center. These mothers are those who come to the hospital for prenatal clinic or those who bring their children to the hospital, nutrition unit and the health center either for post-natal, well-baby clinic or for sick-baby clinic.

The schools were randomly selected but care was taken to include all types in terms of composition of students by sex; the three major nursing schools in Benin were selected, by the help of the ministry of education. The ministries considered to have nutrition related programs were also selected by the help of the ministry of education.

Variables and Hypotheses

On the basis of the experimental design, four major variables are identifiable. These are:

(a) Level of education of mothers and fathers.

(b) Level of nutritional knowledge of mothers, and their impressions of breast-feeding.

(c) Degree of fathers' interest in their children's nutrition.

(d) Major sources of information on infant nutrition.

The first variable deals with the educational levels attained by both husband and wife. For the purpose of this study, there are seven possible levels of education used. These are:

Level 1 - No schooling.

Level 2 - Did not complete primary school.

Level 3 - Completed primary school.

Level 4 - Had some post-primary school (e.g., modern school, grade III teacher, class IV secondary school)

Level 5 - Completed high school (secondary school), higher school certificate, or grade II teacher.

Level 6 - Had some post-secondary schooling (e.g., advanced teachers college, university undergraduate but did not graduate, polytechnic or trade schools).

Level 7 - Had university first dgree and above.

The second variable concerns how much knowledge of nutrition the mother has and how this knowledge relates to her level of formal education. The questions asked to evaluate knowledge of nutrition include:

(a) Name ten to twenty things which you consider food, per se.

(b) What classes of foods do we have?

(c) Why does the body need protein, carbohydrates, fats, minerals, and vitamins?

(d) What diseases do protein-deficient children have?

(e) Which Nigerian foods provide proteins, and which provide carbohydrates? Under this was also evaluated, impressions about breast-feeding with questions such as:

(i) For how long breast-feeding was provided each child?

(ii) Reasons for weaning the child from breast-feeding.

(iii) Foods that were given in place of breast milk.

The third variable deals with the degree of interest that fathers have in the nutritional state of their children. To evaluate this, mothers were asked to label fathers' interests either as none, little interest, or very much interest.

Four hypotheses were considered under the second and the third variables. These are:

(a) The lower the educational level of the mother, the lower the nutritional knowledge that she has.

(b) The older the mother, the lower the level of nutritional knowledge that she has.

(c) The higher the educational level of the father, the more interest he has in the nutrition of his child as against the feeding of his child.

(d) The major reason for breast-feeding is the belief of the natural nourishment it provides the child. This is a major reason for prolonged breast-feeding.

The fourth variable deals with the mothers' major sources of information on infant nutrition. The hypothesis for this variable is:

(a) A major source of information on infant nutrition is hospital nurses.

Also considered in this study are the relative contributions made by primary and secondary schools to nutrition education. In this regard, some primary and secondary school curricula were examined to see what, if any, emphasis is placed on nutrition. The hypothesis considered here is "curricula of both primary and secondary schools in Nigeria have played no active role in nutrition education and have thus contributed to childhood malnutrition."

Another hypothesis considered was in relation to nursing school programs in nutrition. The stated hypothesis is that "there is little or no nutrition education in Nursing Schools in Nigeria, thus making the nurse ill-equipped to help prevent childhood malnutrition."

Also considered is the following hypothesis regarding the role of government agencies in furthering the course of proper nutrition - "lack of publicity and coordination of the nutrition education programs presently in existence are handicaps to the efforts of government to combat malnutrition."

Instrumentation

For this study there were three sets of questionnaires used (Appendices B, C, and D). These three sets of questionnaires are:

(a) An 8 page questionnaire for multiparous mothers (mothers with two or more children) - to find out how much nutrition knowledge they have as compared to their educational background; whether or not protein foods are considered as foods or just mere condiments, and the functions of food as related to the body; whether or not they are involved in or know of any nutrition education programs in the country; to find the sources from which they receive information concerning child nutrition; to find

out whether or not fathers are interested in the nutrition of their children; to find out whether or not they are interested in nutrition education programs if made available; to find out what they consider to be the major cause of childhood malnutrition in the country.

(b) A three page questionnaire for primary, secondary and nursing schools. This is to help find out whether or not nutrition related subjects are taught in the schools as well as the reasons for or for not teaching these subjects.

(c) A one page questionnaire for the ministries. This is to help identify the types of nutrition education programs which the State runs for the benefit of the public and child health.

Methods of Data Collection

For this study, data were collected through direct interviews with mothers in hospitals and in the ministry of health nutrition unit and the health center. All interviews were conducted by the investigator who, using the questionnaire as a guide, recorded all answers personally to ensure that information collected is comparable between mothers.

The same method was used for information gathered from schools as well as from government agencies. Thus, all of the questionnaires were completed on the basis of

person-to-person interviews. In schools, teachers of nutrition or principals were interviewed. In Nursing Schools, matrons or principals were interviewed and, in government ministries, commissioners and/or individuals in charge of nutrition related activities were interviewed.

Data Analysis

The information gathered through the use of the questionnaires were analyzed by use of the computer in an attempt to find answers to the various hypotheses stated earlier. The computer data were then produced in the form of tables and figures which better portrayed the statistical outcome of the study.

In one instance, where correlation between variables was sought, Pearson Correlation Coefficient analysis was employed. This was also done with the help of the computer. Significance level was established at 0.001.

Some of the information obtained from schools and Government agencies did not lend itself to tabulation; but these results were, nonetheless, described and critically appraised.

Chapter IV

ANALYSIS OF FINDINGS

In this chapter, all of the major hypotheses are restated and presented in terms of their statistical outcomes.

General Character of the Population

All of the women interviewed were of child-bearing age (15 to 45 years old). The income levels of the families could be assessed from a combined evaluation of the occupations of both husbands and their wives. From the information collected, the families, on the average, could be said to be of low to middle income (Tables 1 and 2). It will be observed from Table 1 that more than half of the women have no income and 18.6% of them are petty traders. Petty traders bring very little income to the family. However, a combination of husband and wife (or wives) petty trading provides adequate income for maintainance of the family needs. The husbands as shown in Table 2, vary in their occupations and money earning interests as one would expect for a cosmopolitan city.

As pointed out earlier, all of the women interviewed are those with at least two living children. These women

Table 1: Occupations of wives.

Occupations of housewives	Number of women	% of women
None	700	66.3
Secretary/ Clerical	88	8.3
School teacher	72	6.8
*Petty trader	196	18.6
Total	1056	100.0

* A petty trader, as used in this study, is one who buys and sells in small stalls in or out of the market places. Also, according to Bauer (9), petty traders are "small traders"; they are retail sellers who sell their commodities in small quantities.

Table 2: Occupations of husbands.

*Occupations of husbands	Number of husbands	% of husbands
Land lords/Private business	152	14.4
Secretary/ Clerical	288	27.3
School teacher	72	6.8
Petty trader	152	14.4
Taxi driver	136	12.9
Laborer	256	24.2
Total	1056	100.0

* The occupation stated here is what was considered the main money earning venture by the wives. It is worth noting that a number of these husnands are engaged in more than one occupation.

have been divided into six different age groups as follows:

(a) 15-20

(b) 21-25

(c) 26-30

(d) 31-35

(e) 36-40

(f) 41-45

The distribution of these women according to their level of formal educational attainment is presented in Table 3. It will be observed that as much as 42.4% of the women either have no formal schooling at all or did not even complete elementary (primary) education, while only about 9.1% completed secondary (high) school. Considering the fact that this study is in a large cosmopolitan city, the figure 42.4% appears to be a very high rate of illiteracy.

Educational Levels of Mothers and their Knowledge of Nutrition

Regarding the hypothesis that the lower the educational level of the mother, the lower her knowledge about nutrition, one point score each was given to a series of eleven basic questions about nutrition (See Appendix E). Thus, a maximum score of eleven for level of nutrition knowledge was given and the lowest score was zero. About one third (30.3%) of the 1056 women interviewed scored

Table 3: Distribution of women according to age group and level of education.

Educational level (1-7)	Age groups						Number of women	% of women
	15-20	21-25	26-30	31-35	36-40	41-45		
*No schooling	12	56	76	36	24	12	216	20.4
*Incomplete primary	8	100	80	24	12	8	232	22.0
Complete primary	24	144	108	32	12	4	324	30.7
Some post primary	12	60	84	24	8	0	188	17.8
Complete secondary	4	44	12	8	4	0	72	6.8
Some post secondary	0	4	8	8	4	0	24	2.3
University degree	0	0	0	0	0	0	0	0.0
Total	60	408	368	132	64	24	1056	100.0
% total	5.7	38.6	34.8	12.5	6.0	2.3	100.0	

* More than 90.0% of these women can not read or write inanylanguage.

"zero", meaning that they have no idea what nutrition is all about. Ninety two of the 1056 women (8.8%) did, however, show adequate understanding of what nutrition means, scoring between 9 and 11. Table 4 shows a detailed breakdown of the number of women with the different scores. One can infer from this table that about 78.3% of the women (scored 4 or less) have much less than adequate knowledge of nutrition.

In order to illustrate the relationship between this knowledge of nutrition and the educational level of the mothers, the next six Tables (Tables 5 through 10) were produced. In each of these Tables, the relationship between nutrition knowledge and level of education of the six different age groups of mothers was presented.

In Table 5, it will be observed that 12 women in the age group 15-20 who never went to school had no nutrition knowledge at all. Of the 32 women who either did not complete or completed primary school, 16 of them had no knowledge of nutrition, while 12 of them had some idea about the principles of nutrition; and only 4 had a fair knowledge of nutrition. Almost half (28) of the 60 women in this group scored zero, indicating no nutrition knowledge at all.

In Table 6, almost one third (120) of the 408 women in this group have no nutrition knowledge at all. For the 368 women in the age group 26-30, 88 (about 24.0%) scored zero as shown in Table 7. For the age groups 31-35,

Table 4: Points score for women's level of nutrition knowledge.

Points	Number of women	% of women
0	320	30.3
1	264	25.0
2	144	13.6
3	48	4.5
4	52	4.9
5	40	3.8
6	16	1.5
7	40	3.8
8	40	3.8
9	28	2.7
10	20	1.9
11	44	4.2
Total	1056	100.0

Table 5: Nutrition knowledge of women 15-20 years old as compared to their educational level.

Educational level (1-7)	Number of women	Point scores for nutrition knowledge											
		0	1	2	3	4	5	6	7	8	9	10	11
No schooling	12	12	0	0	0	0	0	0	0	0	0	0	0
Incomplete primary	8	4	4	0	0	0	0	0	0	0	0	0	0
Complete primary	24	12	4	0	4	0	4	0	0	0	0	0	0
Some post primary	12	0	0	0	0	0	8	0	0	0	0	4	0
Complete secondary	4	0	0	0	0	4	0	0	0	0	0	0	0
Some post secondary	0	0	0	0	0	0	0	0	0	0	0	0	0
University degree	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	60	28	8	0	4	4	12	0	0	0	0	4	0

Table 6: Nutrition knowledge of women 21-25 years old as compared to their educational level.

Educational level (1-7)	Number of women	Point scores for nutrition knowledge											
		0	1	2	3	4	5	6	7	8	9	10	11
No schooling	56	28	12	8	4	4	0	0	0	0	0	0	0
Incomplete primary	100	48	24	16	8	4	0	0	0	0	0	0	0
Complete primary	144	44	40	28	4	4	8	8	4	4	0	0	0
Some post primary	60	0	8	4	0	4	8	0	0	8	12	8	8
Complete secondary	44	0	4	0	8	0	0	0	8	0	4	4	16
Some post secondary	4	0	0	0	0	0	0	0	0	0	0	0	4
University degree	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	408	120	88	56	24	16	16	8	12	12	16	12	28

Table 7: Nutrition knowledge of women 26-30 years old as compared to their educational level.

Educational level (1-7)	Number of women	Point scores for nutrition knowledge											
		0	1	2	3	4	5	6	7	8	9	10	11
No schooling	76	20	44	12	0	0	0	0	0	0	0	0	0
Incomplete primary	80	32	28	16	0	4	0	0	0	0	0	0	0
Complete primary	108	24	44	20	4	4	4	4	0	0	0	0	4
Some post primary	84	12	4	16	4	12	0	0	12	16	8	0	0
Complete secondary	12	0	0	0	0	8	0	0	0	4	0	0	0
Some post secondary	8	0	0	0	0	0	0	0	0	4	0	0	4
University degree	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	368	88	120	64	8	28	4	4	12	24	8	0	8

Table 8: Nutrition knowledge of women 31-35 years old as compared to their educational level.

Educational level (1-7)	Number of women	Point scores for nutrition knowledge											
		0	1	2	3	4	5	6	7	8	9	10	11
No schooling	36	24	8	0	4	0	0	0	0	0	0	0	0
Incomplete primary	24	20	0	4	0	0	0	0	0	0	0	0	0
Complete primary	32	0	16	4	4	0	4	0	4	0	0	0	0
Some post primary	24	0	4	8	0	4	4	0	0	0	0	4	0
Complete secondary	8	0	0	0	0	0	0	0	0	4	0	0	4
Some post secondary	8	0	0	0	0	0	0	0	8	0	0	0	0
University degree	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	132	44	28	16	8	4	8	0	12	4	0	4	4

Table 9: Nutrition knowledge of women 36-40 years old as compared to their educational level.

Educational level (1-7)	Number of women	Point scores for nutrition knowledge											
		0	1	2	3	4	5	6	7	8	9	10	11
No schooling	24	16	4	4	0	0	0	0	0	0	0	0	0
Incomplete primary	12	12	0	0	0	0	0	0	0	0	0	0	0
Complete primary	12	0	8	0	4	0	0	0	0	0	0	0	0
Some post primary	8	0	4	0	0	0	0	0	4	0	0	0	0
Complete secondary	4	0	0	0	0	0	0	0	0	0	0	0	4
Some post secondary	4	0	0	0	0	0	0	0	0	0	4	0	0
University degree	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	64	28	16	4	4	0	0	0	4	0	4	0	4

Table 10: Nutrition knowledge of women 41-45 years old as compared to their educational level.

Educational level (1-7)	Number of women	Point scores for nutrition knowledge											
		0	1	2	3	4	5	6	7	8	9	10	11
No schooling	12	12	0	0	0	0	0	0	0	0	0	0	0
Incomplete primary	8	0	4	4	0	0	0	0	0	0	0	0	0
Complete primary	4	0	0	0	0	0	0	4	0	0	0	0	0
Some post primary	0	0	0	0	0	0	0	0	0	0	0	0	0
Complete secondary	0	0	0	0	0	0	0	0	0	0	0	0	0
Some post secondary	0	0	0	0	0	0	0	0	0	0	0	0	0
University degree	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	24	12	4	4	0	0	0	4	0	0	0	0	0

zero scores were reported for 44 out of 132 (33.3% women (Table 8)); 28 out of 64 women (43.8%) in age group 36-40 scored zero (Table 9); and 12 of the 24 women (50.0% group 41-45 scored zero (Table 10)).

An examination of these six Tables reveals that, for every age group, there is a consistent direct relationship between the levels of education and nutrition knowledge scores. In order to determine the statistical significance of this relationship, Pearson Correlation Coefficients' analysis was employed. Using this method, r was found to be 0.6690 which is significant at the 0.001 level. To prove this further, Tables 11 showing the score distribution according to educational level, and 12 showing the average score of each educational level were computed. For instance, in Table 11, 112 women in the no schooling educational level scored zero (total score = 0); 68 scored 1 (total score = 68); 24 scored 2 (total score = 48); 8 scored 3 (total score = 24); 4 scored 4 (total score = 16). All the scores in this education level added up to 156 (0+68+48+24+16). Therefore, the average score was 156 divided by 216 which is 0.72. In this way, all of the average scores for the different educational levels are computed as shown in Table 12.

If there were no relationship between educational level and knowledge of nutrition, then the mean score for each educational level would be expected to be about the same as for the grand average. Table 12 shows that the

Table 11: Nutrition knowledge of mothers according to their educational level (pooled data from Tables 5 through 10).

Educational level (1-7)	Number of women	Point scores for nutrition knowledge											
		0	1	2	3	4	5	6	7	8	9	10	11
No schooling	216	112	68	24	8	4	0	0	0	0	0	0	0
Incomplete primary	232	116	60	40	8	8	0	0	0	0	0	0	0
Complete primary	324	80	112	52	20	8	20	16	8	4	0	0	4
Some post primary	188	12	20	28	4	20	20	0	16	24	20	16	8
Complete secondary	72	0	4	0	8	12	0	0	8	8	4	4	24
Some post secondary	24	0	0	0	0	0	0	0	8	4	4	0	8
University degree	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1056	320	264	144	48	52	40	16	40	40	28	20	44

Table 12: Average scores for nutrition knowledge of mothers according to educational level.

Educational level (1-7)	Number of women	*Average score	Deviation from grand average of group averages (D)	D^2
No schooling	216	0.72	+3.47	12.04
Incomplete primary	232	0.84	+3.35	11.22
Complete primary	324	1.96	+2.23	4.97
Some post primary	188	5.32	-1.13	1.28
Complete secondary	72	7.44	-3.25	10.56
Some post secondary	24	8.83	-4.64	21.53
University degree	0	0.00	0.00	0.0
Total	1056	4.19**	0.00	61.60
			Variance =	12.32
			Standard deviation =	3.50

* See text for the method employed in calculating average score (page 55).

** Grand average of group averages.

grand average of the group averages (calculated by adding all the educational level average scores and dividing by six) is 4.19. The standard deviation of the various educational level average scores from the grand average of the group averages is calculated to be 3.5. It will be observed that the average score increased with increasing educational level. The measured standard deviation of 3.5 is an indication of the extent to which the various group averages deviated from the grand average. As pointed out earlier, Pearson Correlation Coefficient analysis showed r value to be 0.6690 which is significant at the 0.001 level.

When the women were asked to name 10 to 20 things which they considered to be food, most of them did not consider high protein foods as food per se but as condiments or spices or something that makes food taste better. When specifically asked if they considered high protein foods (such as meat, fish, shrimps, eggs, etc.) as food, 56.8% (600) of the women did not think that these foods are really necessary for the human body, but do make the food more palatable and hence improve appetite. When these women are separated according to their educational level, it is again seen that their answers bear a direct relationship to their level of education as shown in Table 13. No statistical analysis is necessary to see the correlation.

Feeding children with infant formulae has grown in popularity in Nigeria over the last 20 years. Yet, most

Table 13: The number of women who do not consider high protein foods (meat, fish, shrimps, eggs, etc.) as food and, their educational level.

Educational level (1-7)	Number of women	Protein is food	
		NO	% NO
No schooling	216	152	70.4
Incomplete primary	232	156	67.2
Complete primary	324	196	60.5
Some post primary	188	80	42.6
Complete secondary	72	16	22.2
Some post secondary	24	0	0.0
University degree	0	0	0.0
Total	1056	600	56.8

women who give their children infant formula have no idea of the origin of such formula or of their nutritional values. Questions were asked the women in an attempt to find out how many of them used these infant formulae. An astonishing 93.6% (988 out of 1056) use infant formulae as a supplement to breast-feeding. None of the women used infant formulae exclusively or before the child was three months old. When asked about the origin of these formulae and/or their nutritional values, only 18.2% (192 out of 1056) of them gave correct answers. Once again, correct answers in this case are directly related to the level of education - ranging from 0.0% for the no schooling educational level to 83.3% for those with some post secondary educational level (See Table 14).

Mothers Age and Knowledge of Nutrition

The stated hypothesis here is that the older the mother, the lower her level of nutritional knowledge.

To test this, the average score of mothers belonging to the different age groups was computed. For instance, in Table 15, 28 women in the age group 15-20 scored zero (total score = 0); 8 scored 1 (total score = 8); 4 scored 3 (total score = 12); 4 scored 4 (total score = 16); 12 scored 5 (total score = 60); and 4 scored 10 (total score = 40). All the scores in this age group added up to 136 (0+8+12+16+60+40). Therefore, the average score was

Table 14: The educational levels of women who use infant formulae and the educational levels of those who have knowledge of their nutrient content.

Educational level (1-7)	Number of women	Women using formulae	Number of women with nutrient knowledge
No schooling	216	172 (79.6)*	0 (0.0)*
Incomplete primary	232	220 (94.8)	0 (0.0)
Complete primary	324	316 (97.5)	32 (9.9)
Some post primary	188	188 (100.0)	96 (51.1)
Complete secondary	72	68 (94.4)	44 (61.1)
Some post secondary	24	24 (100.0)	20 (83.3)
University degree	0	0 (0.0)	0 (0.0)
Total	1056	988 (93.6)	192 (18.2)

* Percent of number of individuals in that educational level in parenthesis.

Table 15: Nutrition knowledge scores of women according to their age group.

Mothers' age group	Number of women	Point scores for nutrition knowledge											
		0	1	2	3	4	5	6	7	8	9	10	11
15-20	60	28	8	0	4	4	12	0	0	0	0	4	0
21-25	408	120	88	56	24	16	16	8	12	12	16	12	28
26-30	368	88	120	64	8	28	4	4	12	24	8	0	8
31-35	132	44	28	16	8	4	8	0	12	4	0	4	4
36-40	64	28	16	4	4	0	0	0	4	0	4	0	4
41-45	24	12	4	4	0	0	0	4	0	0	0	0	0
Total	1056	320	264	144	48	52	40	16	40	40	28	20	44

136 divided by 60 which is 2.27. In this way, all of the average scores were computed as shown in Table 16.

If there were no relationship between age and knowledge of nutrition, then the mean score for each age group would be expected to be about the same as for the grand average. It will be observed in Table 16 that the grand average of the group averages (calculated by adding all the age group average scores and dividing by six) is 2.32. The standard deviation of the various age group average scores from the grand average of the group averages is calculated to be 0.4866. There is no one of the average scores that is more than 2 standard deviations from the population average. The mothers in age group 41-45 had an average score of 1.50 which is 1.6 standard deviations from that of the grand average. This does indicate a fairly low level of nutritonal knowledge, but it is difficult to accept the hypothesis in the face of the values presented in the Table.

Fathers' Interest in their Children's Nutrition

The hypothesis here is that the level of the father's education bears a direct relationship with his interest in his child's nutrition.

In order to test this hypothesis, the women in this study were asked to evaluate their husband's interest in their children's nutrition. There were three main

Table 16: Average scores for nutrition knowledge of mothers according to age groups.

Mothers' age group	Number of women	*Average score	Deviation from grand average of group averages (D)	D^2
15-20	60	2.27	+0.05	0.0025
21-25	408	2.98	-0.66	0.4356
26-30	368	2.35	-0.03	0.0009
31-35	132	2.58	-0.26	0.0676
36-40	64	2.25	+0.07	0.0049
41-45	24	1.50	+0.82	0.6724
Total	1056	2.32**	0.00	1.1839
			Variance =	0.2368
			Standard deviation =	0.4866

* See text for the method employed in calculating average score (page 60).

** Grand average of group averages.

categories of evaluation: no interest (scored as 0), little interest (scored as 1), and very interested (scored as 2). Those who scored 1 and 2 were further subdivided into the type of interest they showed: whether the interest is just on food consumption (labelled b) or whether it also involves balanced nutrition (labelled a).

Table 17 shows the results. It will be observed from the Table that 37.5% of the husbands show no interest in their children's feeding or nutrition, while 62.5% show varying degrees of interest. This latter group is divided evenly into two main groups, those that scored 1 and those that scored 2. Of those that scored 1, the interest is overwhelmingly on the consumption of food, rather than on balanced nutrition (21.6% to 9.8%). Of particular significance is the fact that of those fathers who were judged by their wives to show a great deal of interest in their children's nutrition (scoring 2), their interest is overwhelmingly on balanced nutrition rather than mere food consumption (25.0% as against 6.1% for a ratio greater than 4:1).

Another important finding is the relationship that the father's level of education has on his interest in his child's nutrition. In Table 18, the results are tabulated. It will be observed that among those parents who scored 0, their relative proportions decreased as the educational level increased, in such a way that by the time they get to parents with university degrees and above, there was no

Table 17: Fathers' interest in their children's nutrition.

Degree of interest (0-2)*	Number of fathers	Type of interest	
		a***	b****
No interest	396 (37.5)**	0 (0.0)	0 (0.0)
Little interest	332 (31.4)	104 (9.8)	228 (21.6)
Much interest	328 (31.1)	264 (25.0)	64 (6.1)
Total	1056 (100.0)	368 (34.8)	292 (27.7)

* For technique of scoring, see text (page 65).

0 = No interest

1 = Little interest

2 = Much interest

** Percentages are in parenthesis.

*** Interest in proper nutrition.

**** Interest in food consumption.

Table 18: Relationship between father's educational level and his interest in his child's nutrition

Educational level (1-7)	Number of fathers	Degree and type of interest				
		No interest	Little interest		Much interest	
			a*	b**	a*	b**
No schooling	84	60 (71.4)***	6 (7.1)	10 (11.9)	6 (7.1)	2 (2.3)
Incomplete primary	48	16 (33.3)	5 (10.4)	11 (22.9)	11 (22.9)	5 (10.4)
Complete primary	348	180 (51.7)	23 (6.6)	77 (22.1)	49 (14.1)	19 (5.4)
Some post primary	328	104 (31.7)	28 (8.5)	100 (30.4)	76 (23.1)	20 (6.1)
Complete secondary	148	32 (21.6)	16 (10.8)	28 (18.9)	60 (40.5)	12 (8.1)
Some post secondary	52	4 (7.6)	6 (11.5)	2 (3.9)	34 (65.3)	6 (11.5)
University degree	48	0 (0.0)	20 (41.6)	0 (0.0)	28 (58.4)	0 (0.0)
Total	1056	396	104	228	264	64

* Interest in proper nutrition.
** Interest in food consumption.
*** Percentages of number of fathers in each educational level in parenthesis.

0 score. This trend is even more clearly illustrated in Figure 2. It will be observed in this figure that the graph dips down at educational level 2 (incomplete primary). This is most likely because of the immense difficulty in placing fathers in this group. Some of the fathers in this group may have had informal education that could be equivalent to educational level 3 (complete primary) or higher, but because formal education was used as the criterion, they could not be classified higher. In addition, information was derived from the wives, most of whom themselves did not have any formal education, were not certain of the educational level of their husbands. As a result, they used criteria such as reading of newspapers, writing of letters, and signing of names in assessing their husbands' educational level, which makes level 2 fairly inaccurate.

There were 332 fathers who scored 1 for degree of interest. For these fathers, there does not seem to be any relationship to educational level. However, all of those with university degrees and above showed interest in proper nutriton rather than in mere food consumption (See Figure 3). As a matter of fact, this trend was evident among those with some post secondary education, where the ratio of those fathers showing interest in proper nutrition to those showing interest in mere food consumption was about 3:1 (11.5% to 3.9%) as shown in both Table 18 and Figure 3.

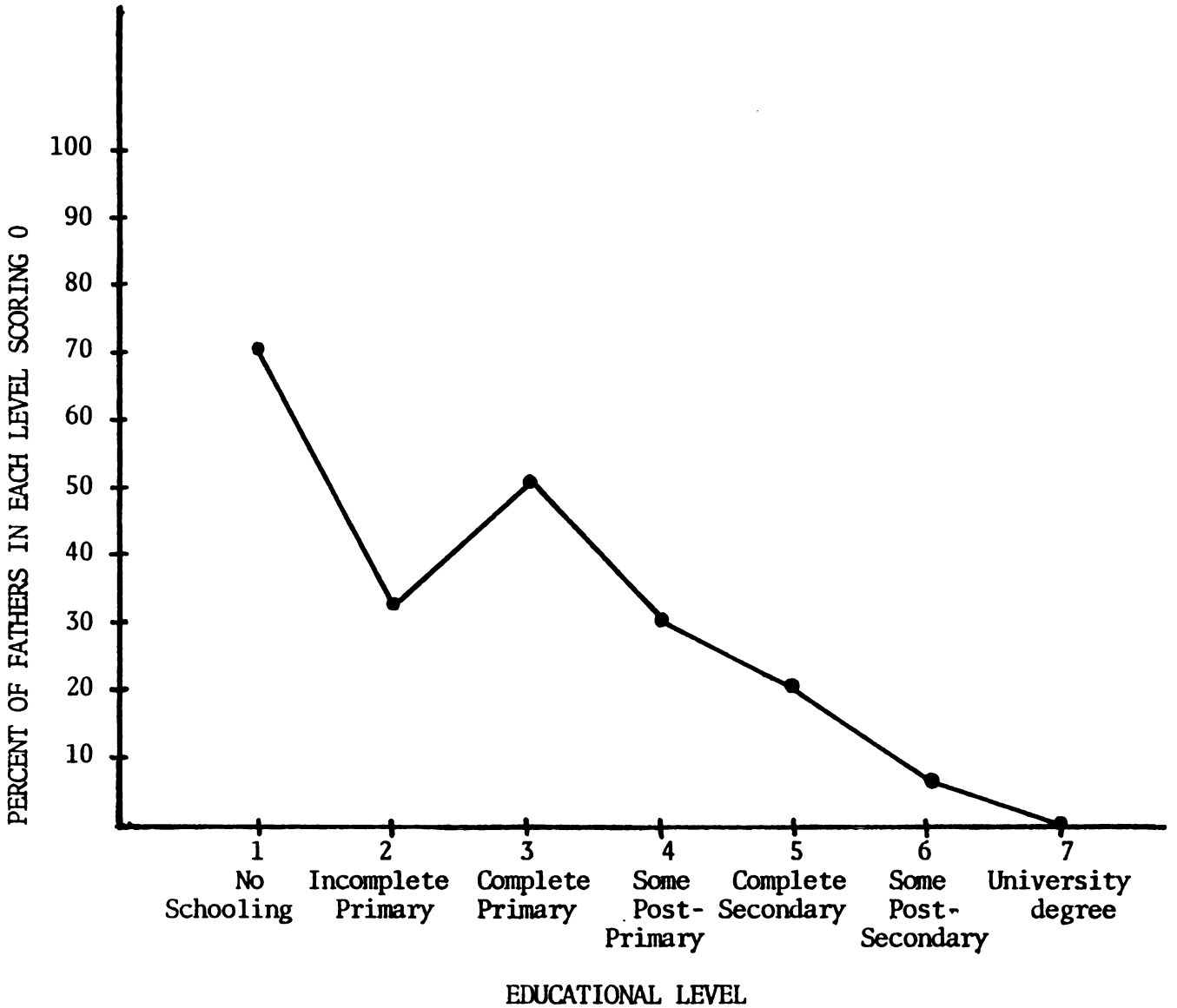


Figure 2: Educational level and proportion of Fathers scoring 0 (no interest) in Child's nutrition

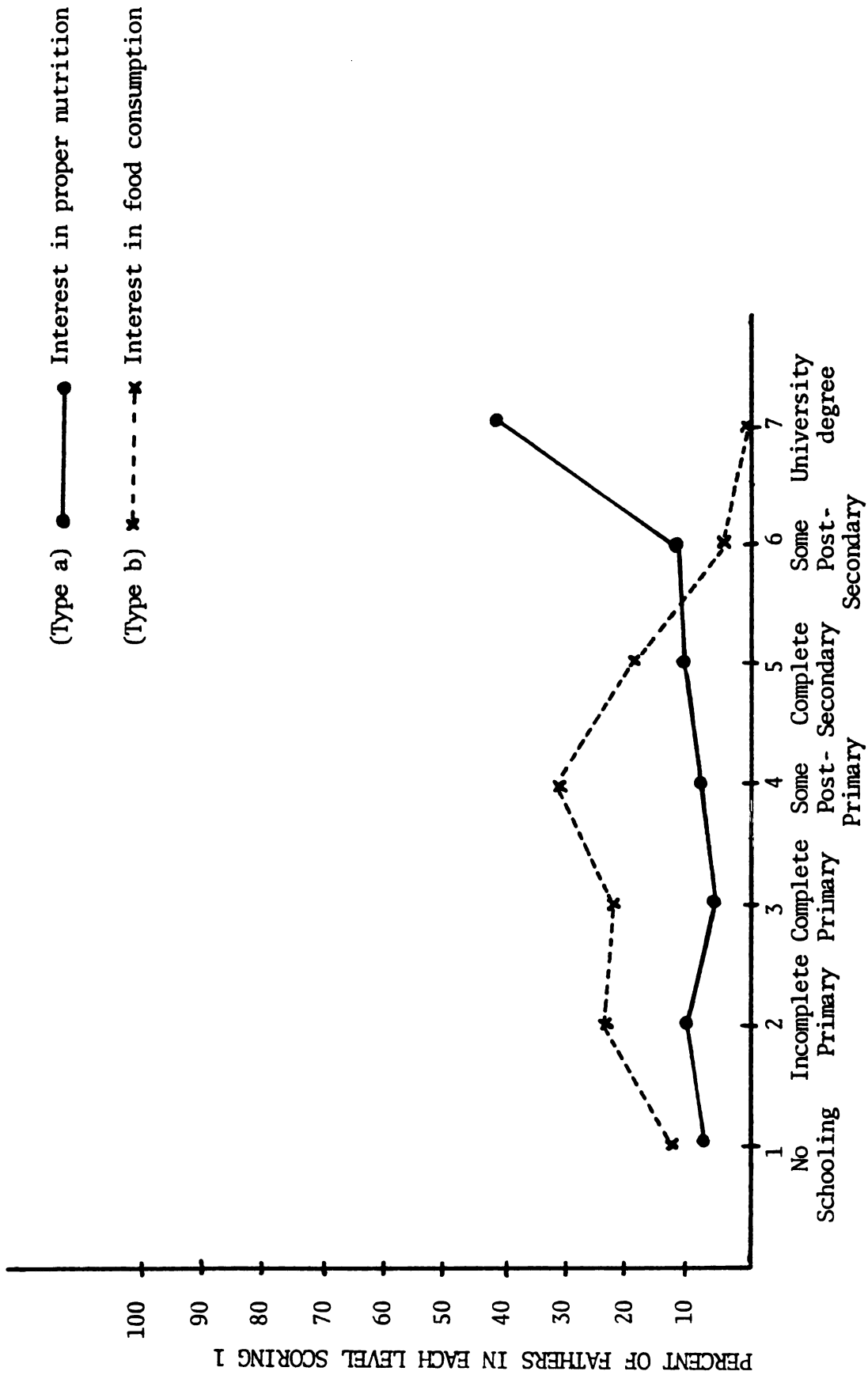


Figure 3: Educational level and proportion of Fathers scoring 1 (little interest) in Child's nutrition

The distribution of the 328 fathers that scored 2 for degree of interest according to their educational level, was very impressive (See Figure 4). The percentage of fathers showing "type a" interest seemed to increase significantly with increase in educational level. The proportion of fathers showing "type b" interest, however, remained relatively the same at all educational level except among those with university degrees and above, when all fathers showed only "type a" interest.

The general trend, therefore, seem to be that the father's educational level bears a direct relationship with the degree of interest he shows in his child's nutrition. The data also seemed to relate educational level positively to the type of interest the father showed.

Reasons for Breast-feeding

The hypothesis tested is that mothers breast-feed their babies because they consider it the natural way of nourishing the babies.

To test this, mothers were asked to give reasons why they breast-fed their children. Interestingly, all 1056 women used breast-feeding as the only mode of feeding their children at the time of birth. The least length of time that breast-feeding was used exclusively was 3 months.

All of the answers given by the mothers fall into three main categories only. These are:

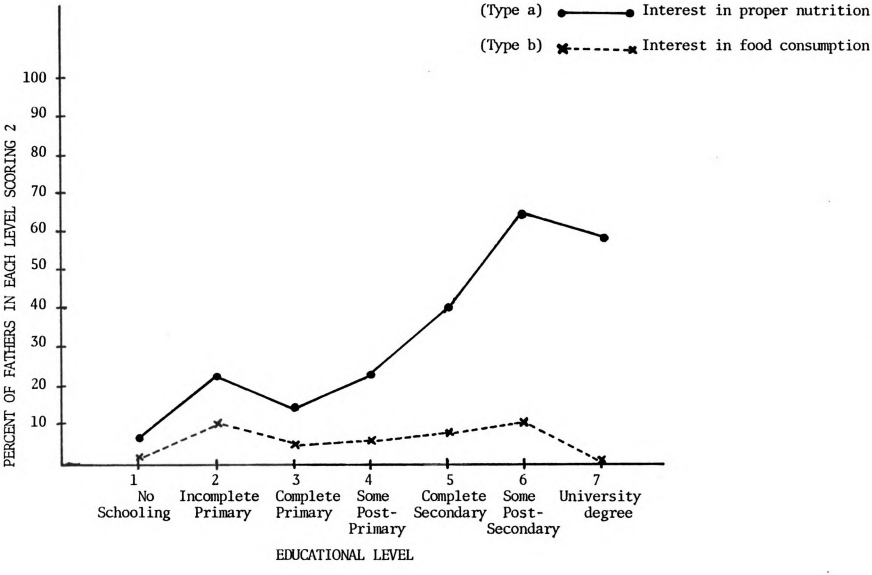


Figure 4: Educational level and proportion of Fathers scoring 2 (very much interest) in Child's nutrition.

(a) Economic - can not afford the extra expenses of buying baby formula.

(b) Biological - nature's desire that breast milk be fed to babies and that is why every nursing mother is gifted with instantly available breast milk. There is no great fear of contamination.

(c) Traditional - our mothers fed us this way, their mothers fed them the same way, and we cannot stop it now.

A small number of these women gave more than one reason, hence, the total showed in Table 19 is that of total number of reasons given rather than the total number of women giving those reasons. It will be observed from the Table that 3/4 of the time, mothers gave a biological reason and the other 1/4 of the time, the reason given is a traditional one. Less than one-half percent of the time, an economic reason was given.

It is worth noting that no one of the mothers gave as a reason the excuse that breast-feeding cause breasts to droop.

From which Source do Mothers Learn most about Nutrition?

It is hypothesized here that hospital or clinic nurses provide mothers with the most information about infant nutrition. This is an important factor to know since plans

Table 19: Reasons for breast-feeding.

Reasons	Number of time reason was given	% of total number of reasons
Economy	4	0.4
Biological	769	74.8
Traditional	264	24.8
Total	1064*	100.0

* Total number of reasons given.

to improve nutrition education can be centered around existing sources of disseminating such information.

Answers given by mothers fell under 4 general categories:

(a) Doctors.

(b) Nurses.

(c) Friends and relatives.

(d) Books and mass media.

The results are tabulated in Table 20. Again, it will be observed that some of the women named more than one source and that is why the total is greater than 1056. More than 87.0% of the women named hospital nurses as the main source of information about nutrition. About 9.0% named friends and relatives, 2.7% named books and mass media, while the remaining 1.0% named doctors. The relative unimportance of physicians in the education of patients most likely extends beyond nutrition to other areas of health education.

As mentioned earlier, infant formulae were used by 988 of the 1056 mothers (93.6%). No one of these women used these formulae exclusively or before the child was 3 months old. When asked about their source of information about the formulae, their answers fell under 5 main categories:

(a) None.

(b) Doctor.

(c) Hospital nurse.

Table 20: Source of information on general childhood nutrition.

Sources	Number of times source was mentioned	% of total times source was mentioned
Doctor	12	1.0
Hospital nurse	1024	87.4
Friends and relatives	104	8.9
Booklets, radio, television and newspapers	32	2.7
Total	1172*	100.0

* Total number of times source was mentioned.

(d) Friends and relatives.

(e) Books and mass media.

These answers are tabulated in Table 21. Because some women named more than one source, the total number of responses is greater than the number of women who gave answers. The nurses again provided these mothers with the greatest access to information on infant formula (81.3% of total responses). Friends and relatives were next (9.0%), followed by books and mass media (5.0%), no source of information at all (4.0%) and doctors (0.7%) in that order. One cannot but be amazed by the lack of contribution that Nigerian doctors have made to public health nutrition.

Although only 44 responses of no source of information about infant formula were obtained (Table 21), as much as 392 individuals did not show any knowledge of the nutritional value of these formulae (See Table 14). The reason was that, most of the information received from the nurses is about an alternative to breast-feeding, not about why it is as good as breast milk wich would have included some information about the nutritional value of formulae.

In a typical Nigerian home several decisions about foods are made. What should be eaten; when to breast-feed or give infant formula; when to add solid or table foods; who eats what and in what amounts, etc. In order to find out to whom general nutrition education should be directed, it is essential that information be gained about who makes these decisions. To this effect, mothers

Table 21: Source of infant formula information.

Sources	Number of times source was mentioned	% of total times source was mentioned
None	44	4.0
Doctor	8	0.7
Hospital nurse	904	81.3
Friends and relatives	100	9.0
Booklets, radio, television and newspapers	56	5.0
Total	1112*	100.0

* Total number of times source was mentioned.

responses were classified into 4 groups:

(a) Nobody.

(b) Mothers only.

(c) Fathers only.

(d) Both father and mother.

These results are shown in Table 22. It will be observed that slightly over 70.0% of the decisions made are by the mothers only. In about 28.0% of the time, both fathers and mothers take part in decision making. Thus, in 99.0% of the time, the mother is actively involved in the decision making. There was no instance in which the father alone makes the decision. Only 4 individuals claimed that the need for decision making does not exist in their households since they eat any food that is available on a given day.

Recognition of Malnutrition and Knowledge of the Causes of Malnutrition

Malnutrition is a major cause of infant mortality and morbidity in Nigeria. As pointed out in Chapter II, this is a well documented fact. Early detection of signs of malnutrition is very important for effective management. Questions were asked of mothers to determine their ability to recognize signs of malnutrition in their children and also to evaluate their opinions regarding the reasons why malnutrition is so prevalent in Nigeria.

The question about recognition was asked in such a way that the interviewer made the decision as to whether

Table 22: Decision makers of what foods the family members should eat.

Decision maker	Number of subjects	% of subjects
None	4	0.4
Mothers only	752	71.2
Fathers only	0	0.0
Fathers and mothers	300	28.4
Total	1056	100.0

the answer constituted sufficient ability to recognize malnutrition or not. Table 23 shows the proportion that can recognize malnutrition and this is distributed according to the educational level of the mothers. Not surprisingly, this ability increased with increasing educational level of the mother as shown in Figure 5.

Regarding causes of malnutrition, the answers given fell into 3 classes:

(a) Those that thought it was exclusively because of poverty.

(b) Those that thought it was exclusively due to lack of education.

(c) Those that thought it is a combination of both.

In Table 24, the results are tabulated. It is encouraging to note that about 74.0% of the women named lack of education as all/or part of the cause. About one-half of the women blamed lack of education as the only cause, one-fourth blamed it on poverty as well as poor education and the other one-fourth blamed it on poverty only.

There are a number of nutrition education programs in Benin City that teach mothers such basic facts of nutrition as recognition of malnutrition and proper food habits. However, the existence of these programs is not sufficiently publicized and their coverage is so limited that their usefulness is in doubt. Mothers were asked if they knew of the existence of nutriton education programs in the country. Their answers are tabulated in Table 25. It is

Table 23: Recognition of childhood nutritional deficiency symptoms by mothers compared to their educational levels.

Educational levels (1-7)	Number of mothers	Can recognize malnutrition	
		Yes	% Yes
No schooling	216	48	22.2
Incomplete primary	232	60	25.9
Complete primary	324	132	40.7
Some post primary	188	104	55.3
Complete secondary	72	44	61.1
Some post secondary	24	24	100.0
Total	1056	412	39.0

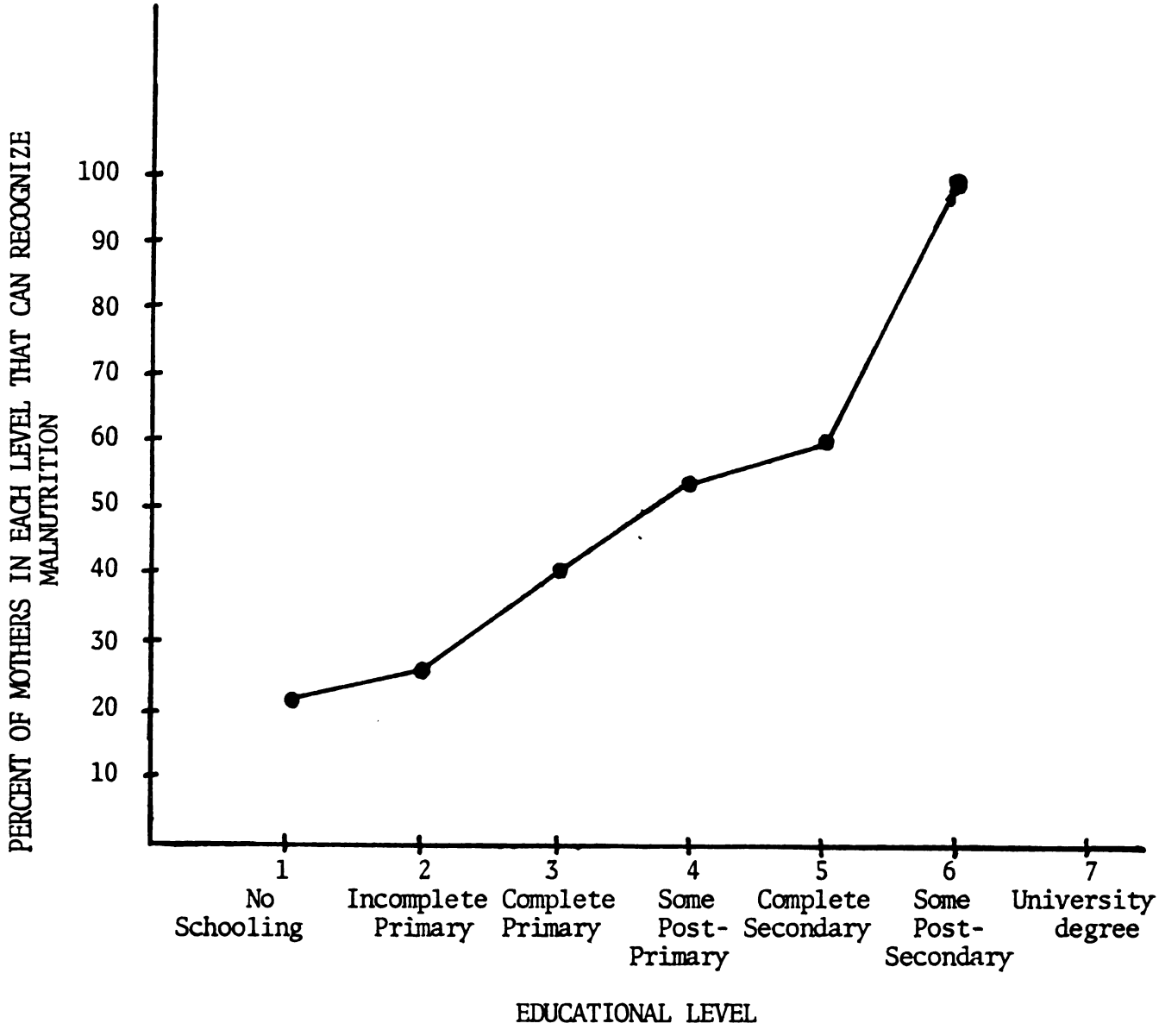


Figure 5: Educational level of mothers and ability to recognize malnutrition

Table 24: Causes of malnutrition in children as seen by the interviewees.

Causes	Number of women giving this cause	% of total number of women
Poverty	276	26.1
Lack of education	532	50.4
Both poverty and lack of education	248	23.5
Total	1056	100.0

Table 25: Mothers' age groups and knowledge of the existence of nutrition education programs in the country.

Age groups	Number of women	Knowledge of programs	
		Yes	% Yes
15-20	60	12	20.0
21-25	408	128	31.4
26-30	368	116	31.5
31-35	132	64	48.5
36-40	64	0	0.0
41-45	24	4	16.7
Total	1056	324	30.7

shown in this Table that only 30.7% (less than one-third) of the women know of the existence of such programs. When this is distributed according to age group and educational level as shown in Tables 25 and 26, no definite pattern seemed to emerge. However, Table 25 shows that all of the 64 mothers in the 36-40 age group do not know of the existence of any programs, those in 15-20 age group as well as those in 41-45 age group showed less knowledge (20.0% and 16.7% respectively) than any of the remaining three groups. The most knowledge of existing programs was demonstrated by the 31-35 age group where one-half of them know of the programs as opposed to one-third in each of the 21-25 and 26-30 age groups. Also, looking at this according to the educational levels (See Table 26), over 40.0% of the women, who had some post-primary education, completed secondary school, or had some post-secondary education, know of the existence of nutrition education programs; whereas, of the other women who did not have more than primary education, less than 30.0% of them knew of the existence of nutriton education programs in the country. The most knowledge of the existence of nutrition education programs was demonstrated by those who completed secondary school education where, about two-thirds of them know of the existence of nutrition education programs.

One important finding under this topic is the fact that when the mothers were asked if they would be willing to participate in nutrition education programs, only 48

Table 26: Mothers' educational levels and knowledge of the existence of nutrition education programs in the country.

Educational level (1-7)	Number of women	Knowledge of programs	
		Yes	% Yes
No schooling	216	56	25.9
Incomplete primary	232	64	27.6
Complete primary	324	68	21.0
Some post primary	188	76	40.4
Complete secondary	72	48	66.7
Some post secondary	24	12	50.0
University degree	0	0	0.0
Total	1056	324	30.7

(4.5%) of the 1056 women were unwilling. The remaining 95.5% were not only willing to participate, but most were enthusiastic about participating in any nutrition education programs.

Family Planning and Education

Because of increased departure from traditional ways of living due to the influences of Western life style, considerable financial strain is imposed upon large families with a lot of children. Although not specifically investigated in this study, the indications throughout the investigation were that there seemed to be a direct relationship between problems of malnutrition and number of children. Therefore, the aspect of this study which tended to correlate maternal level of education and the number of children was thought to be useful. However, it is worth mentioning that most of these mothers still have several fertile years ahead of them and, as a result, valid conclusions can really not be made for most age groups. The number of children according to age group distribution of mothers is shown in Table 27.

It will be observed that no mothers in age group 15-20 have more than 3 children. But these women have better than 20 years of fertile life ahead of them and no one can predict at this time what their family sizes will ultimately be. The same thing is true for the next three or four age groups, only to a lesser extent with each succeeding age

Table 27: Number of children by mothers according to age group.

Number of children	Number of women	Age group of mothers					
		15-20	21-25	26-30	31-35	36-40	41-45
2	396	48	260	64	20	4	0
3	276	12	104	112	35	12	4
4	180	0	24	96	28	28	4
5	104	0	8	56	20	16	4
6	60	0	12	20	20	4	4
7	36	0	0	20	8	0	8
8	0	0	0	0	0	0	0
9	4	0	0	0	4	0	0
Total	1056	60	408	368	132	64	24

group. The only age group where conclusions can be made is the 41-45 age group, where even then, it is with a guarded degree of certainty. In Table 28, the number of children as a function of the educational level of mothers in the 41-45 age group is given. There does not seem to be any relationship at all. It is recognized here that several variables such as degree of fertility and environmental factors have not been controlled. Whatever the case, the impression is that educational level of mothers bears no relationship to the desire to limit family size.

Programs in Nutrition Education

Education in nutrition can be found mainly in programs of departments with nutrition related subjects at the universities. To some degree, nutrition education is also given through the adult education programs of the Ministries of Agriculture, Education, Health, and Logal government, as well as in a few primary and secondary schools. Also, some instruction in nutrition is given in the medical schools and in the nursing schools. Some medical schools and nursing schools send their students to the Nutrition Unit of the ministry of health, for about 10 to 20 hours of instruction in nutrition.

Primary and Secondary Schools.

One of the perceived major functions of schools is to promote the health of the community. It is hypothesized here that curricula in these schools have not played an

Table 28: Number of children by mothers in age group 41-45 years and their educational level.

Number of children	Number of mothers	Educational levels						
		No schooling	Incomplete primary	Complete primary	Some post primary	Complete secondary	Some post secondary	University degree
2	0	0	0	0	0	0	0	0
3	4	4	0	0	0	0	0	0
4	4	4	0	0	0	0	0	0
5	4	0	4	0	0	0	0	0
6	4	0	4	0	0	0	0	0
7	8	4	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
Total	24	12	8	4	0	0	0	0

active role in nutrition education and have thus contributed to problems of malnutrition. This study has revealed, through answers by school principals that there has not been an emphasis on nutrition education in schools, and that schools' syllabi covering aspects of nutrition are not mandatory, but optional for the students.

Of the seven primary schools examined, one does not teach nutrition at all and the remaining six indicated they do teach nutrition. However, on closer examination, it was found that what is actually taught is techniques of food preparation. Some of the responses of the principals are tabulated in Table 29. It will be observed that 6 of the 7 primary schools taught food preparation techniques and 2 taught home management which includes, among other things, when to eat breakfast, lunch and supper. No other area of nutrition is taught.

In terms of reasons why nutrition is not taught, one principal did not think it was part of the curriculum. The other 6 felt that it was part of the curriculum, but not required. In two schools it was felt that the students were not interested in such subjects. All of the schools felt that nutrition should be a woman's subject only. Even then, they all agreed that they do not have trained teachers to teach their girls nutrition.

When asked if they would like to see more emphasis on nutrition, all schools were willing. However, when asked

if they would like to see their male students learn all aspects of nutrition, only 4 out of 7 said they would like it and, of these, 2 were women principals.

There were 15 Secondary (High) schools examined. Of these, 5 were for boys only, 5 were for girls only, and 5 were mixed. No one of the boys' schools taught nutrition per se, except in such related subjects as Agriculture and basic nutritional biochemistry under Biology courses. Table 30 displays answers given to some basic questions about nutrition courses in these schools. It is shown in the Table that 3 of the 15 schools (20.0%) consider nutrition a "girls only" subject; 2 of these 3 schools are boys schools and 1 a mixed school with a male principal. One male principal of an all girls school was not aware that nutrition is an approved secondary school certificate subject. The principals of 4 of the all boys schools deny teaching nutrition as part of any subject, yet these schools have in their Biology courses, topics such as digestion, metabolism of carbohydrates, fats and proteins. Apparently, these principals do not consider these to be topics in nutrition. There was only one school in which nutrition is taught as a separate subject titled "Foods and Nutrition."

When asked if they would like to see nutrition taught to male students in their schools, 2 principals of boys only schools answered in the negative. These are the same 2 principals that claimed that nutrition is a "girls only"

Table 29: Elementary (Primary) school responses to questions on nutrition education courses.

Primary schools	Teach nutrition	Aspects taught*					Reasons for not teaching**					Would you like nutrition taught in your school?***	
		a	b	c	d	e	r	s	t	x	y	m	n
1	No	0	0	0	0	0	0	+	0	+	+	+	0
2	Yes	+	0	0	0	0	0	+	0	+	+	+	+
3	Yes	+	0	0	+	0	0	+	0	+	+	+	+
4	Yes	+	0	0	0	0	0	+	0	+	+	+	0
5	Yes	+	0	0	0	0	+	0	+	+	+	+	+
6	Yes	+	0	0	+	0	0	+	+	+	+	+	0
7	Yes	+	0	0	0	0	0	+	0	+	+	+	+
Total		6	0	0	2	0	1	6	2	7	7	7	4

* a = Food preparation; b = Nutrient contents of foods; c = Balanced diet and dietetics; d = Home Management; e = Food habits.
** r = Not part of curriculum; s = Part of curriculum, but not required; t = Students not interested; x = Subject for women only; y = No trained teachers.
*** m = More emphasis on nutrition; n = Male students learning all aspects of nutrition.
+ = Positive answer.

Table 30: Responses to questions on nutrition curriculum by secondary (high) schools.

Questions	Number of schools responding positively			
	Boys only	Girls only	Mixed	Total
Is Nutrition a "girls' only" subject?	2	0	1	3 (20.0)*
Is Nutrition an approved secondary school certificate subject?	5	4	5	14 (93.3)
Do you teach Nutrition as a part of other subjects?	1	5	5	11 (73.3)
Do you teach Nutrition as a separate subject?	0	0	1	1 (6.7)
Would you like to see Nutrition taught to male students?	3	5	4	12 (80.0)
Would you like to see Domestic Science or Home Economics taught to male students?	0	5	2	7 (46.6)

* Percentages in parentesis.

subject (Table 30). One male principal of a mixed school also gave a negative answer for the same reason as his 2 other colleagues. No "boys only" schools would want to teach Home Economics or Domestic Science to their students. Three of the principals (all males) in mixed schools also do not want their male students taught Domestic Science. Some of these principals were appalled at the suggestion of asking their male students to be involved in a feminine subject such as Domestic Science. One of their responses was, "we are here not only to help develop the minds of these boys, but to make them think and act completely as men, not half men and half women."

Nursing School Programs in Nutrition.

It was hypothesized that there is little or no nutrition education in nursing schools, thus making the nurses ill-equipped to help combat malnutrition.

It was found that most of the nursing schools do not have established nutrition courses as part of their curriculum. However, a few nursing schools send their students to the Nutrition Unit of the Ministry of Health to receive a few hours of lectures on nutrition for one to two weeks. These courses are in the form of didactic lectures to the nurses rather than field experience designed to expose nurses to the magnitude of the problem of malnutrition and what community agencies are available to the population for coping with these problems. Unlike

the Primary and Secondary schools, however, all of the nursing schools visited indicated that male nurses should not be excluded from nutrition courses taught in the schools.

Government Agencies.

The function of the Ministry of Agriculture as related to nutrition is in the following areas:

(a) Food production - this includes both crop and animal production as well as fisheries.

(b) Food storage and consumption.

(c) Marketing of food produces and importation and exportation of foods. Importation and exportation of foods is by the Federal ministry rather than State ministry of Agriculture.

(d) Distribution of seeds for planting.

(e) Farming methods, soil fertility and land tenure and use.

Most of the programs are directed toward producing more foods. There was no program on nutrition education. The type of nutrition education program which the ministry runs is mainly agricultural extension services. For example, disseminating government policy on agriculture and foods to the people as in the recent Operation Feed the Nation (OFN), a campaign designed to encourage individuals to grow their own foods with the ministry helping to distribute seeds, at low cost, to interested individuals.

The Ministry of Education's involvement in nutrition education is in providing schools with course content on nutrition in their curricula. In this way, uniform standards are ensured in all schools under the jurisdiction of the ministry.

It is under the Ministry of Education that the Home Economics department is established. The function of the Home Economics department includes nutrition curriculum planning for primary, secondary and teachers training schools. For secondary schools, it is in collaboration with the West African Examination Council. In spite of this effort, however, the subject is still not being taught because of chronic unavailability of nutrition teachers. Even the Home Economics department itself lacks a highly trained nutritionist to guide their nutrition education activities.

The major functions of the Ministry of Health as related to nutrition are:

(a) To participate in coordinated nutrition surveys and food consumption surveys.

(b) To participate in health programs that influence nutritional status.

(c) To provide health criteria to be used in the evaluation of nutrition related programs.

(d) To distribute supplementary food to children, pregnant and lactating women.

(e) To provide nutrition and health education for the public.

(f) To import nutrition related drugs such as vitamins.

This ministry also runs three major units dealing with nutrition education for mothers. These units are:

(a) The Health Center - This center functions as a clinic for both well and sick (preschool) children. It does carry out nutrition education with the mothers who take their children there either for regular check ups or for illness. There is no format as to how this nutrition education is disseminated. It is at the discretion of the nurse in charge.

(b) The Health Education Center - This center, at the moment, is not yet in full operation and its goals do not seem to be well defined as yet.

(c) The Nutrition Unit - This unit deals with the prevention and treatment of malnutrition in children as well as a nutritional rehabilitation center. This unit was set up because of the high prevalence of childhood malnutrition in the country, and to provide, at little or no cost, a level of nutritional care for children with mild cases of malnutrition or during convalescence from severe malnutrition. In this unit, mothers are also taught different types of diets

and feeding techniques. Therefore, this unit is not only concerned with treatment of malnutrition in children, but also with the prevention of recurrent malnutrition.

This unit is also involved in providing supplementary foods and feeding programs to the most needy population groups with a view to helping children attain their daily minimum nutrient requirements. Generally speaking, this type of program per se, does not correct the underlying problems of childhood malnutrition but it provides a level of nutritional care for children with less than severe malnutrition. The unit refers severe malnutrition cases to the hospitals for combined nutritional and drug treatment.

The Ministry of Local Government is mainly concerned with social change of which nutrition is a part. This ministry has a nutrition related section which is under the umbrella of the Home Economics division. The duties of this department of Home Economics are not well defined. It is not certain if any relationship exist between this Home Economics division and the Home Economics department of the Ministry of Education.

This ministry also runs the Women Training Center in Benin. This center trains women to be rural development workers and organizers as well as volunteer workers. Food and nutrition education is a major part of their training.

The Ministry of Education, and the Ministry of Health are also jointly involved in an aspect of Adult Nutrition Education for food vendors and school chefs (cooks). They make it impossible for cooks to retain their jobs in the schools or for food vendors to sell their foods unless they undergo this training and get certified by the Ministry of Health.

Chapter V

SUMMARY AND RECOMMENDATIONS

An analysis of the role of Adult Education on the factors that influence malnutrition, especially that of children, in Nigeria has been carried out. This study, as clearly outlined in the previous chapter, involved 1056 women each of whom has had at least 2 children. Regarding programs in Nutrition Education, 7 elementary (primary) schools, 15 secondary (high) schools, 4 government ministries and 3 nursing schools were examined. Among the 15 secondary schools were 5 that are mixed, 5 "boys only" schools and 5 "girls only" schools.

Reviewing the character of the study population, it was shown that almost every occupational group in Nigeria was represented. The study was designed in such a way that this variability in the background and economic standing of individuals in the study group was essential in making some of the comparisons that constitute some of the highlights of this research.

The Importance of Education on Nutrition

The relationships that were established include educational level and maternal knowledge of nutrition. It was shown for each age group that the higher the level of education, the greater the knowledge of nutrition. This relationship was shown to be statistically significant using Pearsons Correlation Coefficients analysis. The implication of this is that formal education does improve the awareness of mothers about the facts of good nutrition. This is in spite of the fact that there is evidence to show that school programs pathetically lack courses in nutrition in their curricula, as will be discussed later. Almost every aspect of nutrition showed this remarkable direct relationship to formal education of mothers. The age of the mothers does not seem to have any relationship with their nutrition knowledge. This, of course, means that the direct relationship between nutritional knowledge and level of formal education is true for each of the six different age groups.

In another aspect of this study, fathers were evaluated as to their interest in their children's nutrition. A little over one-third of the fathers were stated, by their wives, not to show any interest in their children's nutrition. It was shown here again that the proportion of fathers who show no interest in their children's nutrition decreases markedly with increase in the educational level

of these fathers. Further, those who show interest in their children's nutrition, the type of interest (whether on proper nutrition or on mere food consumption) seem to be dependent upon the level of father's education. The more formally educated the father, the more likely the interest is on proper nutrition.

This information tends to emphasize the role that formal education can play in the prevention of malnutrition. In terms of fulfilment of research objectives, this section examined the present state of knowledge that Nigerian mothers have about nutrition. It also determined what mothers know about the nutritional values of common Nigerian foods. It also helped in fulfilling the objective whose aim was to determine what role husbands play in their children's nutrition.

Breast-Feeding

An estimated 93.6% of the surveyed mothers use infant formula in feeding their children. The 6.4% who do not use it just do not consider it desirable. There was no one woman who used it exclusively; it is always used to supplement breast-feeding, meaning that quite a number of Nigerian women use breast-feeding for varying periods of time as the main mode of feeding their children. When asked the reasons for breast-feeding, three-fourths of them thought it was nature's way of rearing a child. Although not expressed in these terms, almost all of the

women alluded to the psychological satisfaction that breast-feeding gives to them. A number of the women did not think that they needed to give reasons for breast-feeding, since that is the method of feeding babies that was passed on to them from their ancestors. A handful of the women did not think it is sound economics to buy the same milk (infant formula) that one had been blessed with (breast milk). Thus, contrary to the aesthetic rationale in Western countries for not breast-feeding, the logic in Nigeria is in favor of breast-feeding.

This aspect of the study did examine the impressions of Nigerian mothers about breast-feeding and did evaluate the proportion of mothers in Nigeria that use commercial infant formulae.

Sources of Information about Nutrition

About 9 out of every 10 mothers identified the hospital nurse as the most important source of disseminating general nutrition information. Only about 3 out of every 100 instances were newspaper, TV or radio commercials indicated. Physicians provided little or no information to their patients about nutrition. Relatives and friends featured in providing nutrition information in about 9 instances out of 100.

Regarding specific information on infant formula, once again the hospital nurse was mentioned 8 out of every 10

times as the main source, relatives and friends only 9 out of 100 times, and mass media commercials only 5 out of every 100 times. The physician was rarely mentioned as a source of information on infant formula.

The implication here is very interesting. Programs designed to improve public awareness of the facts of nutrition should pay major attention to nurses, not only in terms of emphasizing nutrition in their course content but also in terms of involving them actively in efforts to combat malnutrition.

The sources from which mothers get information regarding proper feeding was determined in this aspect of the study. Also determined was the impact of mass media advertisements on infant feeding and the relative role played by physicians, nurses, relatives and friends on nutrition.

Decisions about foods and feeding at home were shown to be primarily the function of the mother. These decisions include what is to be eaten, quantity to be eaten, when to eat, who eats what and what the baby is fed on. In this regard, this study showed that 99.0% of the time, the mother is involved in the decision-making and 70.0% of the time, she alone makes the decision. The implication of this is that programs on nutrition directed at the mothers are bound to yield more effective results. To a large extent, this fulfilled another of the objectives of the study.

Programs in Nutrition Education

The sum total of the findings here is that nutrition has never been emphasized in any school curriculum and that attitudes towards nutrition are archaic. There is a shameful shortage of teachers in Nutrition, which is not surprising in the face of an implicit inferior status accorded to the study of foods, nutrition and home economics in general. The study of nutrition is considered so derogatory that some school principals even denied that they teach aspects of nutrition as part of other subjects. Although willing to see nutrition courses taught to their students on a more established and regular basis, some school principals still do not think that their male students need that kind of education. It does appear, therefore, that in expanding on existing nutrition courses and developing new ones for schools, it should be borne in mind that they should be mandatory for all students rather than optional as is the case at the present time.

Regarding government programs, four different ministries are involved in nutrition. The evidence is strong that no one cares what the other's program is, yet there are considerable overlaps in objectives. There is duplication of facilities in a country where need and economy ought to dictate consolidation and pooling of efforts. It stands to reason, therefore, that the government badly needs a central agency to coordinate efforts in nutrition

and to synthesize a single effective unit from the fragments of present governmental programs. Figure 6 demonstrates a conceptual paradigm for such coordination.

General Comments

It is significant to note that in the last decade there has been a steady rise in health care facilities in Nigeria. The situation is very clearly exemplified by the figures of Ebie (24) reported in Table 31. As would be expected, various categories of health personnel also increased dramatically. However, conspicuously absent are Health Educators and Nutritionists as shown in Table 32 (also adapted from Ebie (24)). No updated figures exist beyond 1972, but it appears likely that the situation has not improved much since that time.

It is unfortunate that emphasis has not been placed on Nutrition Education before now in Nigeria. It is important not only in many aspects of food production but also in the general health of the population. For instance, a knowledgeable person is needed to tell the public facts to improve food production, storage, processing, and consumption; to educate society (with limited income) on food choices, and food contamination. Malnutrition in children can be prevented if parents know the causes and the correct measures to be taken to prevent it. Thus, nutrition education is very important for the physical, psychological, emotional and the total well-being of the individual.

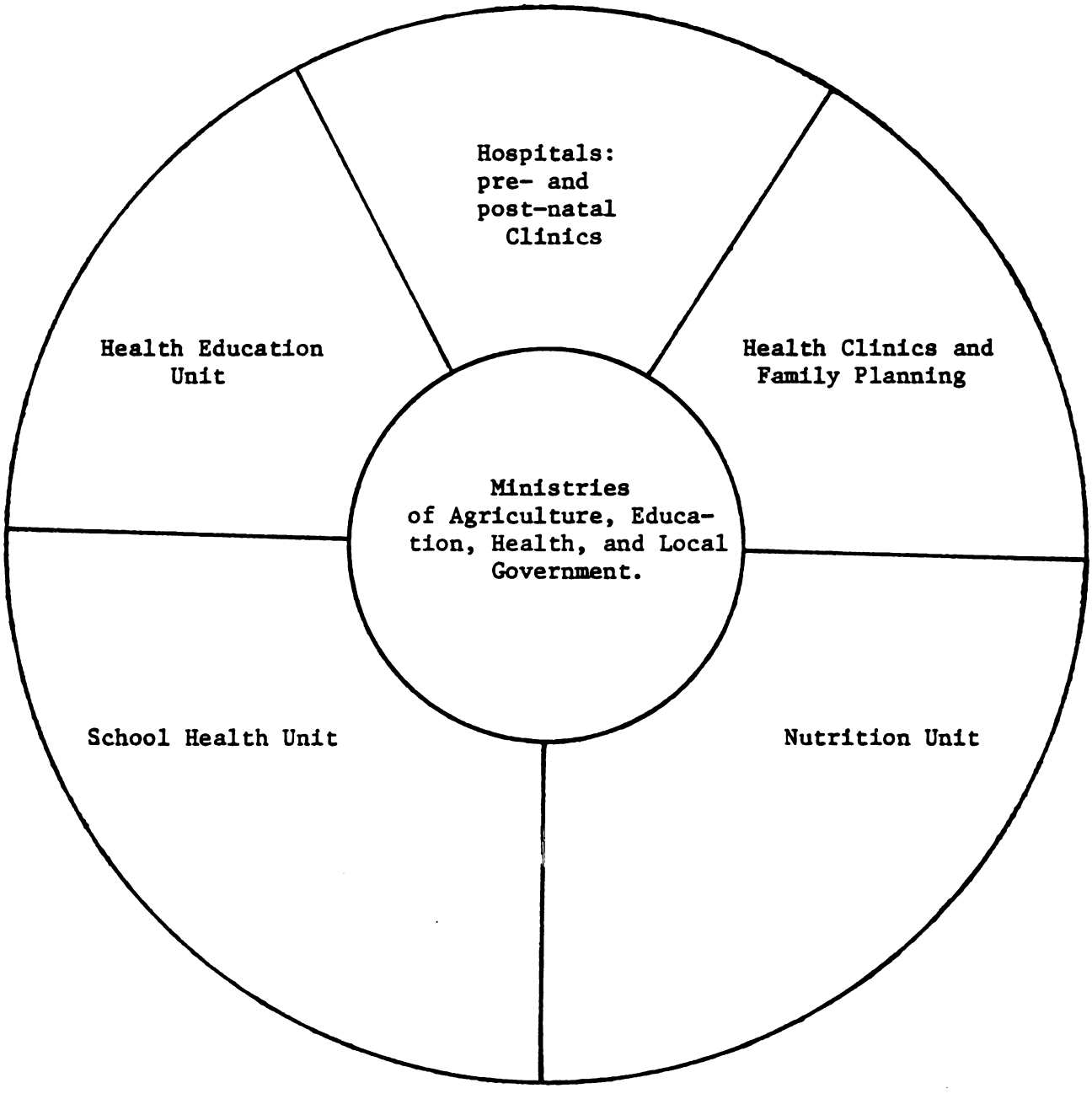


Figure 6: Government programs in nutrition

Table 31: Health care facilities in Bendel State as adapted from Ebie (24).

Categories of health facilities	Number available in 1963	Number available in 1972
Hospitals	18	37
Health centers	4	103
Maternities	87	163
Dispensaries	183	137
Dressing stations	0	42

Table 32: Growth, in numbers, of major health personnel in Bendel State as adapted from Ebie (24).

Categories of personnel	Number in 1963	Number in 1972
Physicians	17	120
Dentists	2	3
Pharmacists in government service	9	14
Nurses	175	863
Radiographers in government service	?	7
Laboratory technologists	?	19
Physiotherapists in government service	?	1
Health educators	?	0
Nutritionists	?	0
Health superintendents and inspectors	31	80
Laboratory assistants	?	9
X-Ray technicians and attendants	?	6
Dispensing assistants	?	27

? = Figures are not available.

Recommendations

The remarks of Griffin and Light (35) are appropriate in opening this section:

> "If it is agreed that a healthy nation is potentially a more powerful and effective member of the community of nations, it must be agreed that the problems and issues of nutrition are central to the advancement of national interests. If this is the case, there is a strong argument for the allocation of necessary resources to nutrition education and to the development of new curricula designed to act directly upon the needs of the people."

It is with this kind of thought and feeling, so eloquently stated above, that recommendations are being made here. It should be pointed out at this stage that not all of the recommendations directly emanate from the research results. Some of them are personal opinions and others were adapted from what is known to have worked in other countries.

What need to be done

What needs to be done, in a nutshell, is to improve and expand the sum total of the nutrition services that must be delivered to the population - children, adolescents, adult men and women, and the aged. This, of course, means that the components of such nutrition services have to be identified and ways for improving and/or expanding each component suggested. The components of a comprehensive nutrition service are multiple and they include:

(a) Screening and surveillance: This is probably the very first essential service that needs effective development. It is the service through which we

select the patients who are most likely to need nutrition services. In a country like Nigeria where malnutrition is widespread, where resources (both manpower and financial) are limited, and where attitudes towards nutrition are at best indifferent, it is not realistic and practical to initially direct programs in nutrition to everybody. That is why the screening service is very necessary for the purposes of identifying, in a general sense, the groups who need nutritional help the most so that programs could be directed more specifically at such groups.

It is, of course, obvious that the development of screening tools would be a very difficult task because the problems of nutrition are very complex due to the mere fact that they stem from many causes. This study showed that an adequate simple screening device could be set up which considers:

(i) Level of education.

(ii) Economic status.

(iii) Culturally tied food habits.

(iv) Availability of food.

Through surveillance, a follow-up of these groups would be ensured. It is essential to establish the extent to which nutrition services have succeeded in providing for the needy. This can only be adequately assessed by appropriate surveillance. Thus,

surveillance also will serve the purpose of evaluation of the programs.

(b) Nutrition education: In this study, an overwhelming majority of those interviewed blamed poor education as the major cause of nutritional problems. This is why this service must be regarded as a priority in efforts to prevent problems in nutrition. Different individuals in Nigeria present different educational needs in nutrition as portrayed by the examples below. These needs have to be met differently.

(i) Attitudes of policy makers - during the entire period of this investigation, one glaring fact is the indifference of individuals in positions of authority towards nutrition problems. Consequently, active policies are not drawn up in this regard. What is gratifying is that these individuals appear to be willing to support programs in nutrition as long as they do not have to take the initiative. The education of this group is relatively easy. What is mostly needed for them is to be regularly confronted with the magnitude of the problems of nutrition; to be regularly reminded of their obligation to the people to provide a better life for them; and to be regularly informed that the resources exist to make everyone nutritionally

self-sufficient if only they put in some efforts. Formal or non-formal education sessions do not need to be held. Their education will come from results of investigations such as is reported here.

(ii) Attitudes of school teachers - whereas everyone was enthusiastic about the problems of nutrition, many still felt nutrition should be a subject for females only. The reasons given at best were chauvinistic. To these individuals should be directed the same kind of educational programs suggested for the policy makers and, in addition, they need be informed of the role male nutritionists have played in the provision of nutrition services in other parts of the world. During the occasional continuing education seminars for teachers, sessions should be included that emphasize the Nigeria nutritional plight and the role the country can play in finding solutions to it. Mandatory nutrition or Home Economics courses for all school children may also be helpful in changing attitudes.

(iii) The masses who can not read nor write any language - Education of this group is, perhaps, the most difficult. Individuals who can not read nor speak in the official language of

communication, English, have an enormous problem of not understanding what government policies are, what concerns are being expressed by various experts and, what measures are planned to help find solutions to problems. To this group, the education should take the form of government propaganda. Mobile nutrition units, with film strips and slide shows, all of which highlight nutrition programs and the benefits of proper nutrition should be available to reach remote rural places. This type of technique has been employed in nutritionally developed countries such as the U.S.A. with enormous success (69).

In order to make programs in nutrition more meaningful to these individuals, community leaders must be convinced as to the credibility of these programs. Some amount of free food, no matter how meager, must be available for distribution to the very needy. Facilities should exist for demonstrations of locally available food stuffs and how they can be utilized in the provision of a balanced diet. Efforts should be made to recognize and respect the food habits of the people and, where these habits do not adversely affect

basic concepts of good nutrition, they should not be discouraged no matter how irrational.

(iv) Education of mothers in general - This study showed that mothers are the most important individuals as far as childhood nutrition is concerned. It showed that nutrition knowledge is dependent upon the general education of the mothers and that most mothers gain their knowledge of nutrition from hospital nurses. With this kind of information, programs should be centered in hospital clinics, rural health centers and maternities, and dispensaries (where drugs are dispensed to the needy). With the increasing dependence on these facilities for health care maintenance, efforts should be made to expand their functions. In-service or continuing education training in nutrition should be made available to all personnel working in these health care facilities - nurses, midwives, drug dispensers, sanitary inspectors, etc. As a part of their routine patient care, it should be mandatory for them to discuss with their patients, important aspects of nutrition in the community on a daily basis. This should be supplemented by occasional visits of a trained person in nutrition to these

areas for more detailed programs such as demonstrations, film strips, slide shows, group discussions as mentioned earlier. Announcements as to when these demonstrations are to take place could be done by the clinic nurses or personnel to their patients. This also underscores the great importance of a strong nutrition program in nursing schools.

It would be very good to be able to involve fathers in this educational process. However, it is not easy to get men involved in a program on nutrition in a male-dominated society such as Nigeria. Nonetheless, it is hoped that success in educating the mothers will permeate somehow to the fathers. Besides, in order to accomplish the mission of helping to prevent malnutrition through education, this study has shown the fathers to be relatively unimportant since their influence is comparatively minimal.

(v) Education of children - This can best be accomplished by the introduction of nutrition or related courses into primary school curriculum. There are no aspects of development plans that should be more important than this. These courses should be mandatory for every child. The introduction of nutrition into

the school curriculum must be done in such a way that it is of relevance to the students. According to Griffin and Light (35),

> "the design of nutrition in the school curriculum must reflect the real and present needs and conditions of learners. It must be problem-centered, enabling learners to engage in guided exploration so as to discover the role of nutrition in the lives of people, the nutritional environment, and the interplay between the two... It must create in the school-age child a desire to learn about nutrition and develop the skills to further this learning. It must be made practical, allowing the child to become familiar with the patterns of his own food culture, to use available foods in resourceful ways, and to acquire the capacity to earn his livelihood and enjoy life."

The purpose of nutrition education in the primary school should be to help stimulate the child's interest in the foods he eats and in the reason why it is essential to have balanced nutrition. However, in setting up a curriculum for this level of education, it must always be remembered that nutrition and health mean very little to children. As eloquently stated by De Esquef of FAO (21),

> "the child has various interests, which may be related to physical strength, skill in a certain activity, appearance, or success in studies. These aspects of the individual are closely tied to the state of nutrition and health but, insofar as the child is concerned, the words nutrition and health, tend to be abstract and vague."

For nutrition to have any meaning to the child, he has to identify his nutritional interests with something of concrete meaning and well defined to him. There is no doubt

the reason why food companies advertise their products with famous athletes and heroes.

Therefore, nutrition teaching at this level should incorporate the subject into other major primary school subjects as has been done in many developing countries and found to be successful (21). For instance, in teaching the English language in the classroom, sentences such as, "If I eat green vegetables, fruits, with meat or fish every day, I will be a good soccer player as Pele" or "If I eat plenty of fruits with meat or fish or snails every day, I will be a pretty singer as Miriam Makeba," could be used and this is likely to make the child modify his eating habits for better nutrition. Also, in teaching addition and subtraction in mathematics, examples with nutritional implications could be used, e.g., "In my uncle's small poultry, ten eggs were first laid and a day after, thirteen eggs were laid. How many eggs are there all together; and if my uncle's children ate six of the eggs for better nourishment the following week, how many are left all together?" This type of teaching method has been shown to be very effective in stimulating lot of nutritional interest in the child. The child does not only learn his mathematics, he also gets to know what a poultry is and knows that eating eggs provides better nourishment. He may even begin to develop interest in his parents having a poultry in their backyard. This method could be used for all the major subjects in the primary school. A curriculum as

simply stated above could arouse the nutritional interests of both child and family, and it could help modify food habits positively.

The theory of nutrition taught in the classroom should be accompanied with practical experiences for the children, such as visits to market places to show the children the varieties of locally available food which many of them may never have seen nor eaten before. Another way to give the children practical experience is by food preparation. Unfortunately, this has so far been limited to female students only. The teachers in all of the primary and secondary schools visited pointed out that food preparation is a woman's subject. Hence, males have notoriously been excluded from classes in food preparation by the teachers. Food preparation classes are essential for teaching children, and probably, adults too, the effects of heat, cold, and storage on the nutritional value of foods. It also helps teach how methods of food preparation can improve the taste of foods and how variations in preparation can remove monotony from eating. Male students should be encouraged, in fact mandated, to participate.

Another way to give the children good practical nutrition experience is through school gardens and farms. Several schools in years past had such facilities which, for lack of encouragement, had to be abolished. The school garden could be used to develop a school snack program for the school. School feeding in itself is a very important

nutrition education activity in schools and has been suitably referred to by Rees and Conafay (70) as "the nutrition education laboratory" and "a place where theory and practice are combined." Feeding programs in schools provide an opportunity for the children to learn and to know the varieties of local foods, the knowledge of which they will take back home to their parents. This will form a basis for the promotion of good nutrition habits in terms of production and consumption of food. Also, children in the primary schools are in their formative years, and whatever they experience in their youth tend to live long with them. This applies to teaching nutrition to children. Once food habits are formed in a child, it is difficult to change them as the child grows older. This is why nutrition education in the primary school is a very crucial and urgent issue.

With the introduction of universal free primary education in Nigeria, every child is now destined, by law, to pass through schooling in his path towards maturity and independence. Thus, if nutrition education is introduced into school curriculum at the level of primary schools, every child in the country will leave school with a basic knowledge of the principles of nutrition. Some of the same reasons can be given for advocating the introduction of nutrition into the curriculum of high schools, teacher training colleges, nursing schools and medical schools.

However, nutrition at the level of primary schools is far more important than at any other level. Hence, this plan must be pursued vigorously and with enthusiasm.

Other roles of the nutritionist in Nigeria.

The nutrition profession in a developing country like Nigeria must deal not only with disease problems of malnutrition (marasmus, kwashiorkor, vitamin deficiencies) but also with several problems of living that these diseases stem from. These include:

(a) Help with family size - There is evidence that mothers who have short interconceptional periods and those with high multiparity are likely to need lengthy nutrition counselling and help (23). Thus, in developing plans for the improvement of child nutrition, family planning should be a major part of the services to be provided by the nutritionist.

In developing countries where income per capita is very low, it has been reported that rapid population growth (because of increased birth rate) contributes to further lowering of the per capita income (31). In other words, increased birth rate increases the number of mouths that a stable income feeds. Consequently, there is less food for everyone and malnutrition results. Informed curtailment of the family size

might, therefore, help in improving this aspect of the problem. Several attempts at family planning in the past have only been minimally successful because of the enormous cultural obstacles that are present. These obstacles include:

(i) Cultural beliefs about what constitutes a good family.

(ii) Cultural and religious beliefs about birth control.

(iii) Cultural attitudes towards sexes of children born into the family.

(iv) Acceptability of birth control methods.

The nutritionist must, therefore, have adequate training to appreciate the societal structure and practices and to know ways of adapting these for effective introduction of new ways of life.

(b) Help with home and money management - This area is probably one of the most neglected, yet it contains part of the solution to health related nutrition problems. The public has to be knowledgeable about what constitutes the best buys from a nutritional standpoint. They must also be knowledgeable about storage facilities and who needs which foods most at home. All of the counselling and education in the world about nutrients may be less than effective if mothers

do not spend money on foods sensibly and if the foods are not stored and distributed adequately at home. This area of help may in fact be all that some individuals need.

(c) Good record keeping - In addition to the tasks of screening and surveillance, nutrition counselling and education, food assistance, family planning help, and help with home and money management, constant follow-up, coordination and evaluation are essential. This is almost impractical without good, complete and purposeful records. Therefore, the nutritionist must learn to identify areas that need documentation.

In essence, what is being suggested here is, that a nutritionist working in Nigeria, must have a wider area of coverage (in terms of academic interests) than is usually the case. This individual must be a good biologist, a good educator, a good sociologist, a good social worker, a good economist, and a good psychologist. This may sound like asking too much but it probably takes no more than dedication to be functionally good in a country in need of such services. From the foregoing, the grave need for training persons in nutrition programs in Community Health services can not be over-emphasized.

Food and nutrition policies.

Advice to government on nutrition has always been by persons from academic and research establishments with nutrition-related interests such as nutritional biochemists and physicians. These individuals are only peripherally nutritionists and their advice has always been on technical rather than policy issues of relevance to applied nutrition. Good nutrition for infants, children, adolescents, and pregnant women is essential to health, and programs for providing it should be regarded as instruments of social progress. Therefore, food and nutrition policies should be National rather than State based. These policies should call for the following, which appear to be the most urgent areas where government policies need to be directed, at the present time:

(a) Establishment of more nutrition units, either independently or as part of comprehensive Health Care Centers, in rural areas. Every Administrative Division, at least, needs such a center. Because most Divisions already have existing Health Centers, it is suggested here that nutrition programs be formally added as part of their function.

(b) Establishment of food policies on the basis of physiological needs. The problems of malnutrition manifest themselves most profoundly among infants and children. Consequently, they belong

to a very high priority group in terms of physiological needs. Adolescents need nutritional support for the attainment of maximum growth, development and potentials. They too belong to a high priority group. Pregnant women are often faced with severe nutritional inadequacies particularly iron deficiency. They also belong to a high priority group. The nutritional dilemma of the aged is, probably, universal and they are usually placed in a high priority group in terms of physiological needs. Thus, in establishing food policies on the basis of physiological needs, infants, children, adolescents, pregnant women and the aged are placed in high priority for special consideration in the administration of food programs.

(c) Massive education as the main tool for fighting problems of malnutrition in the country. This policy should address itself to several of the issues on education that have previously been described. The massive education of policy makers, of teachers, of nurses and physicians, of school children and of the masses of non-literate Nigerians should be pursued vigorously. Each of these have been discussed earlier.

(d) The actual provision of food assistance to the needy by the government. This policy should

adapt the same philosophy as that for "Food Stamps" and "WIC (Women, Infants, and Children's Supplemental Food Program)" which are currently being used in the U.S.A.

(e) An energetic training scheme for more workers in the field of nutrition or allied subjects. In this regard, nutrition programs need be expanded in the universities to accomodate more students. These students should vary in their professional interests as possible - ranging from biochemists to extension workers. They should also vary in their training from full academic degrees to professional diplomas. Summer in-service programs should be organized for the provision of continuing education in this field. More scholarships should be made available for specifically training these workers. The training scheme should aim at producing about 1000 nutritionists, dieticians and allied workers in the next five years.

Need for future research.

The hallmark of any investigative process is the identification of areas within that field that need further investigative efforts. During the preparation for this study, in the execution of the investigation, in the analysis of the data from this study, and in the

preparation of this manuscript, areas which appear to be in urgent need of investigation are:

(a) Epidemiology of malnutrition or nutritional disease in Nigeria. This should include incidence of prevalence, distribution, etiologic factors and possible seasonal variations.

(b) Evaluation of presently existing nutrition education programs. This should include:

(i) Adequacy of the teaching methods.

(ii) Content of the program.

(iii) The clientele served.

(iv) Successes or failures including reasons.

(c) Income distribution and its implications on food production and supply policies. This should include aspects of price control, food export and inport policies, and food distribution policies.

(d) Investigation of food processing industries in the light of types of foods processed, methods for storage, additives and preservatives. This area has been partially researched by the Nigerian Institute for Industrial Research.

There are, of course, many more areas of pure and applied nutrition that need investigative efforts. This research has only highlighted those areas in which lack of available information made the research efforts less than optimum.

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APPENDIX A

APPENDIX A

DISSERTATION PROPOSAL

The role of Nutrition Education on the factors that influence childhood Nutrition in Nigeria.

Objectives:

1. To examine the current state of understanding that Nigerian mothers have about the proper nutrition of their children.
2. To determine what factors govern the decision as to how a child is to be fed and nourished.
3. To determine the sources from which mothers get information regarding the proper feeding of their children and, to determine the relative role played by physicians, nurses, relations, friends, booklet advertisements, TV and radio, about infant nutrition.
4. To examine and evaluate the impressions that Nigerian mothers have about breast-feeding - factors that determine length of time of breast-feeding and weaning.
5. To determine how many mothers feed their children commercial formulae.
6. To determine what Nigerian mothers know about the nutritional value of common foods present in Nigeria.
7. To determine what roles husbands play in infant nutrition, and their impressions about breast-feeding.

8. To postulate methods of improving public awareness of the poor nutritional state of the masses of the children and, also, improving public awareness of the nutrition education programs available in the country.
9. To postulate the role that adult education programs can play in improving the nutritional state of Nigerian children.

Theory and supportive research:

There are two main reasons why the act of feeding a child is very important. First and foremost, it provides the nutritive substances that the child needs for strength and growth in every sense of the word. Secondly, the child derives emotional and psychological benefits from being fed - it is believed that the infant obtains from the experiences of eating and drinking and from those who feed him, many of his early ideas about the nature of life and people (1). The later is very rarely lacking in traditional Nigeria. Children are caressed and fed constantly by a large number of people - parents, grand parents, siblings, neighbors and friends. The former and most important reason for feeding a child is what is lacking in Nigeria (and indeed most developing countries of the world) for a variety of reasons. These reasons range from poverty (inability to afford adequate amounts of food) to ignorance about what actually constitutes proper nutrition.

In Nigeria, concern for the poor nutritional state of our children has grown tremendously in recent times. This is partly because there is an apparent increase in the proportion of children who have diseases of malnutrition. This increase is due to inflation, high population growth, and little or no increase in food production. There might also be a slight increased public awareness because of the activities of the few nutrition programs that currently exist in Nigeria. For example, only recently a two-week nutrition course was concluded in Sokoto, Nigeria (2) during which time the Chief Medical Officer for Sokoto State, Dr. Shah, stressed the importance of Nutrition Education. A day before that publication appeared, the same paper published a statement by the Oyo State Commissioner for Health, Dr. Atanda, which sketchily outlined the causes of malnutrition (3). In that statement, Dr. Atanda was quoted as saying that 70% of the children between the ages of one and four suffer from varying degrees of malnutrition in the developing countries of the world. It is apparent that no acceptable definite, or even approximate, figure of malnutrition exist for the whole of Nigeria. Another newspaper, in an article captioned "Alarm on Malnutrition" quoted the Director of Food Science and Applied Nutrition of the University of Ibadan, Professor Omololu, as calling for an increase in "personnel in the field of nutrition to teach nutrition education especially in the UPE (universal primary education) scheme" (4).

From the foregoing, there is little question that Nigeria is prepared for a comprehensive study of the factors that influence childhood nutrition and the ways by which the nutritional status of all children can be improved. With the introduction of the Universal Primary Education (UPE) policy of the Federal Government which commenced in September of 1976, the need to carry out this study has become more urgent. We can not afford to have the UPE when 70% of all the children for whom the scheme was designed have suffered from some malnutrition early in life which, no doubt, affected proper mental development. It will certainly be self-defeating if a high proportion of these children are not educable. It has been shown in well controlled studies by Cabak and Najdanvic (5) that children who had been undernourished in infancy were found, at school age, to have "normal physical characteristics but subnormal mental capacity". I have also observed previously that certain practices resulting from ignorance could severely affect good nutrition (6). Also, in a previous observation, I reported that malnutrition seemed to be a lot more prevailent among illiterates (people who can not read or write any language) than among literates (7) which of course, is a suggestion that education plays a very important role in proper nutrition. Another major problem which needs investigation is the massive availability of infant formulae, the nutritional values of which are

sometimes coubtful. For example, in the issue of March 24, 1976, Nigeria's most popular newspaper, Daily Times, published a full page advertisement which read, "When milk alone is not enough, Formula 33 with honey, a nutritionally complete food for babies from 3 months to three years ..." (8). In this advertisement, no statement was made concerning what the formula contained to make it complete. From personal experience and that of many mothers, there is little question as to the mis-leading nature of these advertisements. What is not certain is whether such advertisements do influence childhood feeding and to what extent in Nigeria.

In spite of the extensive public pronouncements and the various academic articles that have been published on the subject, in Nigeria during the past few years, there has been very little response in the direction of improving the nutritional status of our people. The reasons for this poor response have been very well outlined by Professor S.O. Olayide of the Department of Agricultural Economics and Extension of the University of Ibadan. These are "(1) the imprecise definition of the scope and meaning of nutrition training and its implications for accelerated economic development. (2) the inadequacy of the existing extension organization to cope with demands of a dynamic nutrition training in terms of organization, personnel, material and money. (3) the lack of articulated plan of

programmes on nutrition training for which adequate logistics have to be provided or mobilized for meaningful implementation" (9). These three points advanced by Professor Olayide, seem to emphasize the degree of difficulty that nutritionists have in Nigeria. How can we clearly define the scope and meaning of nutrition training when we do not understand what governs the food habits of our people and what factors influence their choice of available food resources! How can we cope with the emmense extension facilities that a dynamic nutrition training program demands, when we do not know the relative influence that the various health personnel have on the Nigerian mother! An articulated nutrition program can only exist if we know what methods are available to us for improving the nutrition of our children.

There is no doubt, a consensus of opinion that poor or improper education is the major contributing factor to the deplorable nutritional status of our children. True, there are economic reasons (10) as well as cultural and social reasons (6, 11, 12, 13, 14, and 15) for poor nutrition, but with proper education, the effects that these factors have on nutrition could be reduced to a bare minimum.

In order to stress the importance of Nutrition Education in our attempt to solve the enormous problem of malnutrition in Nigeria, it is essential to define the principles of Nutrition Education. In doing this, I choose to refer

to the statement prepared by a Study Group on Nutrition at the VIIth International Conference on Health that met in Buenos Aires, Argentina in 1969 (16, without reproducing it here (The statement is attached as Appendix A1 of this proposal). For us in Nigeria to achieve a reasonably high level of nutrition for our children through the efforts of Nutrition Education, the masses must be made to be aware of the importance of adequate nutrition to the family and the means available for attaining it (17). There must also be a clear knowledge of the various foods that we have available and their nutritional value. We must know the optimum conditions for storing foods under local (or, as some will like to call it, Primitive) conditions. We must know what the contaminants of our foods are. In a nutshell, the task must be a coordinated effort between the different sectors concerned with food (Nutritionists, Health Personnel, Educators, Economists, Agriculturists, Biochemists and Microbiologists, Politicians, and others).

This work is, therefore, an effort to provide appropriate baseline information that is so badly needed in aspects of our fight against malnutrition in children.

METHOD OF INVESTIGATION

Review of literature:

(i) Nutritional status of Nigerian children.

(ii) Cultural influences on nutrition in Nigeria.

(iii) Current ideas about breast-feeding.

(iv) Adult or continuing education in Nigeria (Nutrition Education in Nigeria).

Survey (Methodology):

(i) Sample selection:

(a) Survey will be carried out in the Benin City area of Bendel State of Nigeria.

(b) It is anticipated that for this study, at least, 2,000 multiparous mothers will be included.

(ii) Method of data collection:

(a) For this study, data will be collected through direct interviews with the mothers. All interviews will be conducted by the investigator.

(b) An interview guide (in the form of a questionnaire) will be prepared for use by the investigator. This way, one can be reasonably sure that comparable data are obtained from all mothers.

(c) The investigator will attempt to obtain data that will help answer questions posed in the objectives.

(d) From the State's ministries of Agriculture, Education, Health and Local Government, information about existing Nutrition Programs and plans for future programs will be collected.

(e) From a randomly selected sample of about 24 primary, secondary and nursing schools, information will be gathered as to classes on Nutrition.

(iii) Data analysis:

(a) Factual response data will be compiled and analyzed separately for mothers, ministries and, schools - as they relate to the objectives.

(b) Opinions and recommendations, based on (a) above, will be attempted to meet objectives numbers 10 and 11.

(c) A critical analysis of existing nutrition programs and plans for future programs will be attempted.

(d) Schools' syllabi, as they relate to Nutrition, will be reviewed and critically assessed.

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Appendix A1

BASIC PRINCIPLES OF NUTRITION EDUCATION

The following statement, prepared by a Study Group on Nutrition, during the Buenos Aires 1969, VIIth International Conference on Health and Health Education, sums up the basic principles of Nutrition Education.

1. The process of health education cannot set aside nutrition education as people are unable to achieve physical, mental and social well-being without proper knowledge, attitudes and behaviour with regard to food. In turn, the process of nutrition education must be integrated in global health education with the aim of improving the state of nutrition of individuals, families and communities. Both processes include synergic and complementary action which cannot be planned separately without jeopardizing end results.
2. The precess of nutrition education would achieve more positive results and in a shorter time if it were integrated with regional or national food policy plans, which in turn should be included in national plans for economic and social development.
3. Food policy covers a series of factors related to the supply, demand and consumption of foods to meet the needs of the population, but variations in food supply and demand are, in turn, under the direct influence of

economic and demographic factors and conditioned by the level of the population's education, particularly by its level of nutrition education.

4. Government decisions regarding food policy plans and programmes should include nutrition education which is instructional in the effective implementation of such a policy.
5. The planning of nutrition education programmes requires that nutrition specialists have access to accurate anthropological, social and economic data on the geocultural target groups.
6. The lack of unified norms and concepts in relation to nutrition education leads to a state of confusion which has a detrimental impact on the educational process.
7. To implement food policy plans, including nutrition education, it is necessary to have a sufficient number of trained technicians who can be active at all levels in public as well as in private sectors, and to provide the minimal structures indispensable to ensure the development of plans and programmes.
8. The existence of a confused interpretation of the processes of information and education has a negative influence on the planning, implementation and evaluation of nutrition education programmes and lessens their educational value.
9. Co-ordination between the different sectors concerned

with food (health, agriculture, education and economy, among others) must be ensured at all stages of programme development, i.e. in the planning, the execution and the evaluation phases.

10. The selection of educational techniques reflecting the dynamic and active methodology which characterizes the whole process of modern education must take into account the characteristics of the target groups, social and family structures, cultural patterns, socio-economic standards, levels of instruction, ecological conditions and specific characteristics of the rural, peri-urban and urban populations.
11. Nutrition education must be directed to all levels of the population, to the general public as well as organized groups (in particular groups of mothers, housewives, adolescents, parents, school children, workers, etc.), and focus more specially on categories of populations at risk.
12. Nutrition education must be directed as much to the consumer as to the producer and to all those who, in one way or another, are concerned with the handling of food and need to become, for this very reason, actively involved in the educational process.
13. The family unit constitutes the biological, social, economic, cultural and affective base of the community; nutrition education must therefore be channelled through this basic unit and aim particularly at the

housewife or the person who decides on the family meal pattern, utilizing all available means of mass communication, among which women's journals can play a very important role.

14. The evaluation of nutrition education programmes, based on a preliminary diagnosis of the situation, must be primarily concerned with the assessment of behaviour change at the individual and community levels and, at the same time, provide a measurement of the progress toward goal achievement as well as of the intrinsic usefulness of the indices selected for evaluation.
15. So far, attempts at the evaluation of nutrition education programmes have mainly focused on the volume of activity and the level of knowledge - not on the final objective of behaviour change.
16. Integrated programmes of applied nutrition (i.e. involving a co-ordination between health, agriculture and education services) have a definite impact on the improvement of levels of nutrition, health and education of the community, as well as the nutrition education activities undertaken in primary schools.
17. The problem of gaining acceptance for new foods to supplement traditional diets calls for the combined efforts of specialists in nutrition education, information and promotion in order to accelerate the education process by providing a rational and scientific

basis for promotion campaingns whose efficacy in matters of community motivation cannot be ignored.

18. The promotion of new foods will be easier if these are introduced to the whole population of a country, without distinction of social category, and to all countries of the world without distinction of state of development.

In accordance with the proceeding conclusions, it is recommended:

(a) that governments, principally those of developing countries, give priority ot the establishment of a food and nutrition policy, providing the human, material and economic resources necessary for its execution;

(b) that each country try to unify food concepts and norms, so that technical organizations concerned with nutrition education can give a homogeneous content to programmes;

(c) that inter-disciplinary groups be formed to give leadership to a co-ordinated and effective approach to planning, implementation and evaluation of nutrition education programmes;

(d) that efforts be intensified towards establishing a clear and concise evaluation methodology which could be applied to present and future education programmes;

(e) that the IUHE intensify its efforts to promote, through official and private circles, nutrition education plans which would effectively integrate education techniques with mass promotion.

APPENDIX B

APPENDIX B

QUESTIONNAIRE FOR MOTHERS

GENERAL INFORMATION:

1. Name and address of hospital or location of mother at time of interview _____

   _____

2. Name and address of subject (optional) _____

   _____

3. Age of subject (in years):

   (a) 15-20___ (e) 36-40___ (i) 56-60___

   (b) 21-25___ (f) 41-45___ (j) 61-65___

   (c) 26-30___ (g) 46-50___ (k) 66+___

   (d) 31-35___ (h) 51-55___

4. Marital status: Married___ Single___ Separated___ Divorced___

5. Are you living with your husband? Yes___ No___

6. Profession of: (i) Subject _____

   (ii) Husband _____

7. Subject's number of children___ Ages _____

8. How many of your children did you have in/at:

   (i) Hospital___ How old now? _____

   (ii) Maternity homes with doctors___ How old now?___

   (iii) Maternity homes without doctors___ How old now _____

(iv) Home___ How old now? _____

(v) Church___ How old now? _____

(vi) Others (specify) ___ How old now? _____

EDUCATIONAL QUALIFICATION:

9. How much formal education do you have?:

(i) No schooling___

(ii) Did not complete primary school___

(iii) Completed primary school___

(iv) Had some post-primary school (e.g. modern school, grade III teacher, class IV secondary school)___

(v) Completed secondary (high) school, higher school certificate, or grade II teacher___

(vi) Had some post-secondary schooling (e.g. advanced teachers' college, university undergraduate but did not graduate, polytechnic or trade schools)___

(vii) Had university first degree and above___

10. How much formal education does your husband have? (Please, use sub-questions No. 9 and insert your answers bellow).

(i) ___

(ii) ___

(iii) ___

(iv) ___

(v) ___

(vi) ___

(vii) ___

BREAST-FEEDING, WEANING, AND CULTURAL BELIEFS ABOUT INFANT FEEDING:

11. Did you breast-feed any of your children? Yes__ No __

    (i) If Yes, which ones did you breast-feed?

    _____

    (ii) How long did you breast-feed each?:

    (a) 0 to 3 months___ Present age(s)_____

    (b) 3 to 6 months___ Present age(s)_____

    (c) 6 to 9 months___ Present age(s)_____

    (d) 9 to 12 months___ Present age(s)_____

    (e) 12 months +___ Prensent age(s)_____

12. Why did you stop breast-feeding? _____

    _____

13. Did you think it is good to breast-feed your child/ children at the time you did? Yes___ No ___

    Why? _____

    _____

14. What is your opinion now about breast-feeding? _____

    _____

15. What foods did you give your child after weaning? _____

    _____

16. From what sources did you receive information regarding feeding your newborn child?:

    (i) Physician___ How often?_____

    (ii) Hospital nurse___ How often?_____

    (iii) Friends___ How often?_____

(iv) Relatives (specify)___ How often?_____

(v) Booklets___ How often?_____

(vi) Magazines___ How often?_____

(vii) Newspapers advertisements___ How often?_____

(viii) Others (specify)___ How often?_____

17. Who plans the family meals?:

(i) Father___ (iv) Relative___

(ii) Mother___ (v) Children___

(iii) Grand parent___ (vi) Others (specify)__

18. Do any of your relations tell you anything about what or how to feedi your children? Yes___ No___

(i) If Yes, who? _____

(ii) What does he/she/they say? _____

_____

_____

19. Are there foods you would not like your children to eat? Yes___ No___

(i) If Yes, what are they and, why? _____

_____

_____

20. Who sees to it that your child/children do not eat these foods?

(i) Father___

(ii) Mother___

(iii) Grand parent___

(iv) Relative___

(v) Friends___

(vI) Others (specify)___

NUTRITIONAL KNOWLEDGE OF THE MOTHER AND HUSBAND'S INTEREST IN THE NUTRITION OF HIS CHILDREN:

21. Name 10 to 15 things which you consider to be food (Please, classify these):
    (i) Carbohydrates (starchy foods)_____
    (ii) Protein (body builders e.g. meat, fish, etc.)
    _____
    (iii) Fats and oils _____
    (iv) Vitamins (fruits) _____
    (v) Minerals (vegetables) _____
    (vi) None _____
22. What does the body need the following for?:
    (i) Carbohydrates? Don't know___ Knows___
    (ii) Protein? Don't know___ Knows___
    (iii) Fats and oils? Don't know___ Knows___
    (iv) Vitamins? Don't know___ Knows___
    (v) Minerals? Don't know___ Knows___
23. What type of disease do children without adequate protein get? Don't know___ Knows___
24. From which food(s) do Nigerians get the greatest amount of protein? Don't know___ Knows___
25. From which food(s) do Nigerians get the greatest amount of carbohydrate? Don't know___ Knows___
26. When you see your doctor or when you are in the hospital, who tells you anything about your child's nutrition?:
    (i) Doctor___
    (ii) Nurse___

(iii) Neighbor patient___

(iv) Visiting relations___

(v) Visiting friends___

(vi) Others (specify)___

27. Has anyone ever spoken to you about what constitutes a balanced diet? Yes___ No___

(i) If Yes, who? _____

(ii) For how long (often)? _____

28. Have you ever fed your child ifant formula?

Yes___ No___

(i) If Yes, which kind?_____

(ii) How did you know about it? _____

_____

(iii) Do you know what it contains? Yes___ No___

(iv) Do you have ways of storing the formula?

Yes___ No___

(i) If Yes, is it by:

(a) Refregeration?___

(b) Storing dry powder until ready for use?___

(c) Storing already mixed formula in the cupboard?___

(d) Others (specify)?___

29. If there were programs that teach you how to care for the nutritional needs of your child,

(i) will you participate? Yes___ No___

(ii) Why? _____

_____

30. If you have to pay to participate in this program, would you still go? Yes___ No___

31. What do you think is the main reason for malnutrition in Nigeria?

    (i) Poor education?___

    (ii) Poverty?___

    (iii) Inadequate food supply?___

    (iv) Lack of appetite (secondary to disease)___

    (v) No malnutrition problem in Nigeria?___

    (vi) Others (specify)___

32. Are there any foods that you will not eat because of cultural taboos? Yes___ No___

    (i) If Yes, which one(s)?_____

    (ii) What is the rationale for this taboo?_____

    _____

33. Does your husband show any interest in the nutrition of the children?

    (i) No interest___

    (ii) Little interest___

    (iii) Much interest___

34. Is your husband particular about what food his children eat? Yes___ No___

    (i) If Yes, can you explain to me what he says or does about the type of food(s) the children eat? _____

    _____

    _____

35. What does your husband think about breast-feeding?

(i) does he like it?

(a) Yes__ No__

(b) Neutral__

(c) Don't know_____

(ii) Why? _____

_____

36. Do you know of any programs that currently exist in Nigeria or in Bendel State that is aimed at solving the problems of malnutrition? Yes___ No___

(i) If Yes, what is the program(s)? _____

_____

37. Can you recognize nutritional deficiency in your child? Yes___ No___

(i) If Yes, to whom do you complain? _____

(ii) Why would you complain to this person(s)?__

_____

38. Do you weigh and measure your child's physical growth regularly? Yes___ No___

(i) Why? _____

39. When do you stop taking these measurements?

(i) 0 to 6 months___

(ii) 6 to 12 months___

(iii) 12 months +___

40. Why do you stop taking these measurements at the age you do? _____

_____

APPENDIX C

APPENDIX C

QUESTIONNAIRE FOR SCHOOLS

1. Name and address of school _____

   _____

2. Contact and position _____

   _____

3. Type of school: Check one:

   (a) Elementary___

   (b) Secondary___

   (c) Nursing___

4. Do you teach Health or Domestic Science in the school?

   Yes___ No___

5. If Yes, does this include Nutrition?

   Yes___ No___

6. If Yes, do your Nutrition classes include:

   (a) Cookery (food preparation)?

   Yes___ No___ Why?_____

   (b) Food sanitation?

   Yes___ No___ Why?_____

   (c) Food storage?

   Yes___ No___ Why?_____

   (d) Principles of good nutrition?

   Yes___ No___ Why?_____

   (e) Infant feeding methods?

   Yes___ No___ Why?_____

(f) Nutritional deficiency diseases?

Yes___ No___ Why?_____

(g) Cultural influences on nutrition and food habits?

Yes___ No___ Why?_____

(h) Food values as related to body functions?

Yes___ No___ Why?_____

(i) Nutritional values of Nigerian foods?

Yes___ No___ Why?_____

(j) Nutritional requiremtnts of children?

Yes___ No___ Why?_____

(k) Nutritional requiremtnts in pregnancy?

Yes___ No___ Why?_____

(l) Nutritional requirements in old age?

Yes___ No___ Why?_____

(m) Nutritional requirements at all age levels?

Yes___ No___ Why?_____

(n) Home management?

Yes___ No___ Why?_____

7. Do you consider Nutrition a "girls' only" subject?

Yes___ No___ Why?_____

8. Would you like to see Nutrition taught in your school?

Yes___ No___

If Yes, would you like to see it taught to male students too?

Yes___ No___ Why?_____

9. Is Nutrition a required school certificate (or nursing school) subject?

   Yes___ No___

10. Do you teach Nutrition as:

    (a) A part of other subjects? Yes___ No___

    (b) A separate subject? Yes___ No___

APPENDIX D

APPENDIX D

QUESTIONNAIRE FOR MINISTRIES

1. Ministry and location _____

_____

2. Contact and position _____

_____

3. What types of nutrition education programs do you presently run? _____

_____

_____

_____

_____

_____

_____

_____

4. Do you have plans for future programs in nutrition education? _____

_____

_____

_____

_____

_____

_____

_____

_____

APPENDIX E

APPENDIX E

QUESTIONS ON BASIC NUTRITION ON MOTHERS' QUESTIONNAIRE FOR WHICH ELEVEN POINTS WERE GIVEN

1. If a high protein food is named as a food, a point is given (See Question No. 21 of Appendix B. Total point=1).
2. A point each is given if the interviewee knows what the body needs carbohydrates, protein, fats, vitamins, and minerals for (See Question No.22 of Appendix B. Total points = 5).
3. A point is given if the interviewee knows the type of disease children without adequate protein get (See Question No.23 of Appendix B. Total point = 1).
4. A point each is given if the interviewee knows from which foods Nigerians get the greatest amount of carbohydrate and protein (See Questions Nos. 24 and 25 of Appendix B. Total points = 2).
5. A point is given if the interviewee knows the nutrient content of the infant formula she ever used (See Question No.28 of Appendix B. Total point = 1).
6. A point is given if the interviewee can recognize nutritional deficiency in her child (See Question No.37 of Appendix B. Total point = 1).