

Pan American Health Organization

PAHO/ACMR/XX/13
Original: Spanish

TWENTIETH MEETING OF THE
ADVISORY COMMITTEE ON MEDICAL RESEARCH

Washington, D.C.
8-11 June 1981

CURRENT STATE OF THE RESEARCH
ON NUTRITION IN COLOMBIA

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CURRENT STATE OF THE RESEARCH
ON NUTRITION IN COLOMBIA

José O. Mora, MD
Director, Program on Nutrition
School of Interdisciplinary Studies
Universidad Javeriana
Bogotá, Colombia

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SUMMARY

The present report lists briefly the most outstanding nutritional problems of the Colombian population, which apparently have persisted without notable modifications through the last twenty years. It discloses briefly the principal fields where nutritional research is currently being done in Colombia, indicating some examples of specific projects. The majority of the research is of a diagnostic type (clinical and epidemiological), but prospective studies of the experimental type and specific projects of action-oriented research on nutrition are also being carried out.

The opportunities and needs of action-oriented research as a component of primary health care are multiple, which extension of coverage constitutes the fundamental objective of the strategies of the current National Health Plan of Colombia. The promotion and intensification of action-oriented research on the search for methodologies and appropriate technologies are considered necessary, in optimizing the efficiency of the activities on nutritional education, nutritional surveillance, promotion of breastfeeding, improvement of infant-feeding, dietetic management of diarrheas and infections, community organization, and others that constitute the nutrition component of primary health care.

I. PROBLEMS IN NUTRITION OF COLOMBIA

Diagnostic studies that have been conducted in the country through the last three decades confirmed the point about the severity of the nutritional problems of Colombia, and have contributed consistent information on the magnitude and characteristics of these problems.

The studies carried out by the Colombian Institute of Family Well-being, between 1963 and 1968 in different sites of the country, by means of nutritional surveys and anthropometric valuations, showed that around two thirds of the children under five years presented a degree of malnutrition, in accordance with the classification of Gómez, divided thus: 46% with mild malnutrition, 19% with moderate malnutrition, and 2% with severe degrees. The information currently available appears to indicate that the proportion of children with malnutrition has not varied substantially up to the present; indeed, surveys carried out in 1977 showed figures very similar to the previous ones. This has been situation although numerous programs of nutrition were carried out in Colombia that subsequently led to the formulation and implementation of an ambitious National Plan of Food and Nutrition (PAN), in 1976.

From the various studies it can be concluded that the principal nutritional problems of the country are, in order:

1. Protein-energy malnutrition that affects mainly the children of preschool age, and also a certain proportion of the school population, and pregnant and lactating mothers.

2. Nutritional anemias, especially those caused by deficiency of iron, that affect especially women and children.

3. Other deficiencies of vitamins and minerals, mainly those of vitamin A, calcium and riboflavin. Even though the clinical manifestations of these deficiencies appear infrequently in advanced form in the Colombian population, contrary to other regions of the world, they have been identified, nevertheless, as important problems of nutrition, in both clinical and food studies. Endemic goiter, another of high

prevalence in Colombia, appears to have ceased as a public health problem, as a consequence of the massive addition of iodine to salt for human consumption since 1963.

Protein-energy malnutrition is the most acute and clear of these problems; the vitaminic and mineral deficiencies are found more frequently associated with general forms of malnutrition than isolated specific deficiencies, and usually are of mild or moderate degree, rarely severe. Furthermore, severe infant malnutrition of the kwashiorkor or marasmus type is relatively less frequent than in other developing regions.

The existing data do not appear to reveal variations through time, while observing the persistence of the problems with similar magnitude, up to the point of constituting a general characteristic of a large part of the population that is below the limits of poverty. This apparent stabilization of the problem, without evidence of deterioration and indications of improvement, is evident in a series of studies effected in the last twenty years by various institutions, in samples of different population; at the present time research is being done (that will be described further), which will permit to establish, within a short period, what variations have occurred in the nutritional situation of the Colombian population between 1965 and 1980.

On the other hand, there still exists in Colombia a high incidence of infectious diseases and diarrheas, whose relative frequency has been diminishing very slowly in the last two decades, with exception of the morbidity preventable by immunizations, which has indicated a more clear decline. All this occurred at the same time that clear signs of economic growth of the country are observed, especially in the last ten years, but very little evidence of redistribution of the income or significant social changes.

Furthermore, the statistics on production and overall availability of foods in Colombia, together with the demographic tendencies, indicate that the national production of foods has been and continues being sufficient in order to meet the estimated needs of the total population, and its increase in general, has not been below the rate of population

growth, always keeping up with the population growth. Contributory to this is not only the absolute increase in the production, but also the well known phenomenon of the dramatic decline in fertility and in the Colombian population growth. In the last decade, the annual growth of the production of foods has ranged between 3.5% and 4.9%, which, in terms of population, would give a gain close to 2% on the average, compared to a population increase that in recent years has declined to about 2%.

The food problem is not then one of production or overall national availability, but one of distribution and demand in the poorer socioeconomic strata. It could be affirmed that currently in Colombia the overall deficiencies in production do not constitute a fundamental factor in the etiology of the nutritional problems; the actual causes are operating on the consumption and the biologic use of the available foods in the different socioeconomic strata of the population.

For this reason the current National Plan of Food and Nutrition (PAN) has given special priority to the multisectoral actions directed to increase the availability, the consumption and the biologic use of the foods in the poorest 30% of the population.

11. RESEARCH ON NUTRITION AND FOOD SCIENCES

The Research in Nutrition and Food Sciences are being conducted in Colombia by the following entities: the universities, especially in the Schools of Nutrition, Health Sciences, Rural Economy, Chemistry, Basic Sciences and interdisciplinary Studies; the official and private institutions linked to PAN, among them the Colombian Institute of Family Well-being, the Technological Research Institute, the Foundation for Superior Education (FES), the Center of Studies for Development (CEDE) of the University of the Andes, the SER Institute of Research, the Colombian Agricultural and Livestock Institute (ICA), and the Ministries of Health, Agriculture and Education. These institutions have personnel specialized in nutrition, food sciences, research, economy, sociology, anthropology, economy, and health sciences.

The financing for the nutritional and food research in Colombia comes from external (international entities, private foundations, etc.) and national sources. Among the national sources to be pointed out are the Foundation for Superior Education (FES), the Colombian Fund for Scientific Research and Special Projects Francisco José de Caldas (COLCIENCIAS), and the National Department of Planning, through PAN and the Fund for Development Projects (FONADE).

It would be impossible to present an inventory of the numerous research projects completed or are in execution. The principal areas of research in nutrition and food sciences that have been covered in recent years or are being currently developed in Colombia are the following:

1. Diagnostic Research

Corresponds to the most common and frequent type of research in nutrition, which has, as an objective, to quantify the magnitude of the nutritional problems, their determinants and their consequences or implications for the individual and the society, through clinical studies, epidemiological, biochemical, sociological, anthropologic, economic, agricultural and livestock, etc. In the previous decades, the great majority of the research effected on nutrition and food corresponded to the diagnostic type, and was effected as much by official entities as the National Institute of Nutrition and the Colombian Institute of Family Well-being, as by the Universities; an exception was the Survey of Nutrition of Colombia of 1960, carried out by the International Committee for Nutrition and National Defense of the United States (ICNNI).

At the present time the majority of these studies are framed within the National Plan of Food and Nutrition, and they have diagnostic ends as such, such as the base surveys for the evaluation of programs of nutrition, or also objectives of studying in depth the causes or associated factors and the consequences of nutritional problems. Among the studies under this category are the following:

1.1 The nutritional surveys effected by the National Institute of Nutrition and the Colombian Institute of Family Well-being in different regions of the country, the last of them effected in 1972.

1.2 The studies of Valle University on protein-energy malnutrition and its relation with structures and organic functions: histology and intestinal function, thyroid function, etc.

1.3 The studies on the identification, origin and elimination of natural goitrogens in waters of endemic areas.

1.4 The studies on physical growth effected by the National Institute of Nutrition, from which were derived the anthropometric patterns of reference for Colombian children.

1.5 The Research on frequency and duration of breast-feeding and the associated factors, effected by the School of Interdisciplinary Studies of the Universidad Javeriana (FEI) in 1977, in five regions of the country.

1.6 The National health study of 1965, which made it possible to have a diagnosis of the nutritional situation of the Colombian population in a representative sample of the country.

This study, conducted by the Ministry of Health, the Colombian Association of Schools of Medicine (ASCOFAME) and the National Institute of Health, was repeated between 1977 and 1980 in a representative sample at the level of five regions of the country. This new national study seeks to know the state of health (and nutrition) of the Colombian population, to identify the factors that condition it and to establish comparisons with the situation observed in 1965. Its results will make it possible to know if there have been changes in the characteristics of the nutritional problem, especially regarding anthropometric indicators, between 1965 and 1980, in equally representative samples of the country, contrary to other studies that, by having taken samples selected especially by geographic and socioeconomic conditions, of accessibility to the health services, etc., do not reflect the general situation of the Colombian population nor are strictly comparable through time.

The sample for this study was probabilistic of the non-institutional Colombian population resident in the departments of the country. The sample included approximately 10.000 homes (60.000 people)

in household interview, distributed in 62 primary units of sampling, from which was taken a random subsample of 12.000 people for clinical and laboratory evaluation, including hemoglobin, hematocrit, serum proteins and fractions, folic acid, vitamin B12, Vitamin A, and urinary excretion of iodine. The information collected during this research of national character is currently in the process of analysis.

1.7 Nutritional survey PAN of 1979. For the purpose of establishing a baseline for the evaluation of PAN this study with great magnitude was conducted, in a representative sample of the poorest 30% of the population of the country, objectives of PAN. The survey included anthropometric measurements in the children under five years, and information on the food consumption of the families and the intrafamily distribution of foods, as well as socioeconomic data, of housing and environmental sanitation of the families. This study is also in the process of analysis.

2. Experimental research

This area of research has had special development through the last ten years, financed for the most part by international entities. Among the principal projects pointed out are:

2.1 Research on nutrition, Psychosocial Stimulation and Mental Development, advanced jointly in Bogotá by the Colombian Institute of Family Well-being and the Department of Nutrition, School of Public Health of Harvard University. This longitudinal research was conducted between 1973 and 1980, utilizing an experimental factorial design with assignment of families at random to experimental groups that received food supplements or education on early stimulation of the child, in isolated or combined form. The study was advanced on a cohort of 456 families with undernourished children under five years in which the mother was in the first or second quarter of pregnancy. There were studies, in prospective form, on the family, the mother through pregnancy, and the child from birth up to 6 years of age; the interventions extended until the children

reached three years of age, but the cohort continued under follow-up in the post-intervention period. TSocioeconomic measures were taken periodically, including food consumption of the families, as well as on the health of the mother and the child (morbidity), physical growth and intellectual development of the child through the period of follow-up. The experimental design made it possible to evaluate the impact of the interventions on the nutritional state, the morbidity, and intellectual development of the children.

The already published results of this research, which data continue under process of analysis, have demonstrated the beneficial effects of prenatal supplements on the weight at birth and perinatal mortality.

The impact of postnatal food supplements on the nutritional state was concurrent with the execution of the program, without persisting much beyond its end; its magnitude was moderate, although significant, in terms of prevention of protein-energy malnutrition, and was more clear on the linear growth in length than on the weight growth. The educational program did not produce effects on the physical growth but indeed a significant potencialization of the effects of the food supplements. Both the supplements and the education for early stimulation produced significant effects on cognitive development, specifically on different areas of behavior: the supplements in the motor area and the stimulation in the areas of social development and of language. Finally, the results of this study have confirmed the fundamental role that diarrheal disease plays in the etiology of infant malnutrition, having demonstrated that it acts more as a causal factor than as a consequence of malnutrition; indeed, the high rates of incidence of malnutrition, in spite of the food supplements, could be attributed, greatly to diarrheal disease, in the presence of a usually satisfactory food consumption in the absence of disease, but presumably reduced drastically in presence of infectious and diarrheal diseases. These diseases occupied 40% of the first four years of life of the children, and diarrhea represented around 10% of the time of observation, with greater incidence in the first two years and a maximum at 11 months of age.

2.2 The studies of the Foundation Station of Research Human Ecology, of Valle University, in Cali. This has been another project with vast repercussions in the experimental research field in nutrition and child development. In a sample of 300 undernourished children of 3 years of age, with retardation in cognitive development, the study executed a comprehensive program on health care, nutrition and preschool education applied to different experimental groups, indicated at different ages with a duration of 3 to 6 years.

The comprehensive intervention produced significant recuperation of the intellectual retardation, in more important form than in the physical growth, which was proportional to the duration of the intervention and, concomitantly, to the initiation. The achievements, although significant, especially in the group intervened from 3 to 6 years, represent a partial recuperation of the retardation, if comparisons are made with the levels of development reached by a reference group of upper middle class in the same city. The study demonstrated the feasibility of regaining substantially the retardation associated with multiple deprivation in marginalized children, through the implementation of comprehensive actions of attention in the preschool period.

2.3 The studies of the Center of Research in Interdisciplinary Models of Rural Development (CIMDER), of Valle University, in an area of experimentation in the Department of the Cauca. It involves a program of operations research on the well-being of the rural family, which includes health and nutrition components, in addition to comprehensive community development. One of its areas of work is the organization of agricultural and livestock production based on a system of associative organization; others equally important are the development of a health services system in comprehensive primary care, based on the work of rural health promoters with the organized community, and development of appropriate technologies for primary health care, including nutrition and surveillance of growth.

CIMDER, in its eight years of work, has produced important material on methodologies and appropriate technology for the provision of primary health care services in rural communities, with special emphasis on the

delegation of functions to the rural health promoter, adequately trained, as much in the prevention as in the control of prevalent diseases such as the infectious and parasitic ones, including early oral rehydration. Thus, the work of primary health care has been systematized and a series of manuals has been developed for the promoter in simple and direct activities of role to the environment and to the people, including the "Micro-puesto health", the "Master Fund" that compiles the health and nutrition information of the families assigned to each promoter, the "Chlorinator of raintanks" for the treatment of water at household level, etc.

2.4 The Program of Research in Models of Provision of Maternal and Child Health Services (PRIMOPS). This program is the result of 17 years of experiences, widely known in the town of Candlemas, where the Division of Health of Valle University has been conducting educational, investigative and service programs, which have been extended to the marginal areas of Cali and of other cities. The general objectives of the program are: the design, operation, evaluation and documentation of a system providing comprehensive health services for the mother and the child that have high coverages at costs that can be financed by the government and the community, that is duplicative in other sites of the country and that contributes to improve the level of health and well-being in urban communities; and the integration of a system of manpower training appropriate for the system of provision of health services.

The services have been organized following the scheme of regionalization and levels of attention for progressive patient care according to the risk and priority of their health problems. The levels of regionalization correspond to the categories of primary care: the less complex and specialized that attends 65% of the problems, among them the nutritional, the secondary that attends 25% and the tertiary or highly specialized that attends from 5 to 10%. The services include care of the newborn according to risk by birthweight, care of the growth and nutrition of the child according to risk by nutritional state, care of the child with diarrheal disease according to risk by severity, care of the sick

child according to risk by severity of the disease and care of the child that needs immunizations according to risk by age. The activities with the community are oriented so that it may participate actively through knowledge of its problems and its contribution to their solution. The system includes the definition of tasks, development of a model of supervision and of information systems and of continuous evaluation that measures efficiency, quality and effectiveness.

2.5 The program of Nutrition of Valle University, affiliated with the University of the United Nations, conducts currently two operational research projects: that of Models of nutritional planning, based on the model of the flow of nutrients, offers an operational simplification in the analysis of the problem and the formulation of alternative solution, through the combined study of the nutritional gap and the health conditions that affect the biologic use of the foods; and that of Systems of Food and Nutritional Surveillance, which has been developing and field testing a system of epidemiological surveillance of the more prevalent diseases, utilizing information collected routinely in the health care services, hoping that in the future it can evolve toward the design and introduction of a System of Food and Nutritional Surveillance with inclusion of relevant information related to other subsystems of the system of food and nutrition.

2.6 Program of Research in Nutrition and Food Technology. This program, sponsored in great part by COLCIENCIAS and PAN, is conducted with the participation of several centers of research in the field of food technology, under the leadership and coordination of the Technological Research Institute. numerous research projects on appropriate technology have been performed to improve the nutritional quality of manufactured foods available for human consumption, especially those utilized for child feeding, among which are the studies pointed out regarding the purified proteinic derivative of soybeans (PROVESOL), the substitution of soybeans for wheat in breads and in the preparation of food pastes, the formulation and evaluation of proteinic vegetable mixtures of high nutritional value and low cost such as Bienestarina, developed by the Colombian Institute of Family Well-being, etc.

Currently, and as part of the Andean Program of Technological Development for the industrial food sector (PADT of foods), sponsored by the Subregional Andean Pact (Agreement of Cartagena), research is conducted in the following fields: Generation of intermediate foods from available raw materials (derived from dry legumes, edible flours of cotton seed, intermediate proteinic foods from fish, etc.); experimental production and marketing of new foods of high nutritional value and low cost (formulated foods, rations prepared for institutional feeding in children, tarinaceous foods modified by the substitution of wheat, etc.); technology, production and commercialization of baby foods; and studies of technological innovation in the food subsector.

3. Action-oriented research on infant feeding

This project, sponsored by the Program of Action-Oriented Research on Nutrition of the World Health Organization, is being conducted by the School of Interdisciplinary Studies of the Universidad Javeriana, in a rural community in the Department of Cundinamarca. A first phase is proposed after organization and motivation of the community and with the active participation of the primary health care services, to carry out a detailed study of the cultural patterns and determining factors of the practices of infant feeding in the rural area, especially breastfeeding and the process of weaning, through the application of methodologies of anthropologic research, for the purpose of identifying problem areas in infant feeding and their determinants.

The analysis and interpretation of this information will be made jointly with the rural health promoters and the community, for the purpose of formulating actions tending to improve these practices, through the joint action of the primary health workers and the community, as a fundamental part of the component of nutrition on primary health care. The second phase, of implementation of actions, will be oriented toward development of methodologies of implementation through appropriate technologies in community education, local production, preservation, preparation and consumption of foods, as well as to the establishment of a

simplified system of information that permits a routine nutritional surveillance through the primary health care services. The Project contemplates, also, a final phase of evaluation and the preparation of methodologic manuals derived from the experiences and results, for the implementation of the actions that should be included within the component of nutrition of the primary health care services. Currently there is consideration on the possibility of expanding this project with the inclusion of a systematic component of prevention of infectious and diarrheal diseases, including basic rural sanitation, hygienic and health education, immunizations, periodic disparasitization in children under three years of age and timely control of diarrheas through the routine introduction of early rehydration. It is hoped that, while the purely nutritional component will produce a significant improvement in the practices of infant feeding, the addition of the component of infection and diarrhea prevention not only will have a marked impact on the incidence of morbidity, but also important repercussions on the nutritional situation and mortality.

4. Evaluative research

The majority of the research actions in this field are under the responsibility of the Division of Evaluation of PAN. Within the general plan of Evaluation of PAN, the SER Institute of Research has just completed the evaluation on the impact of the several programs that make up PAN in a pilot area in the Department of the Cauca. The programs that have been the object of the greatest efforts of evaluation are that of Nutritional Education, especially in relation to the promotion of breastfeeding, and that of subsidized distribution of foods by the system of coupons, with positive results, although of a relatively modest magnitude. On the other hand, through 1979 and 1980, the World Food Program effected an evaluation on the impact of the programs of food supplements conducted by ICBF with foods donated by said agency.

III. ACTION-ORIENTED RESEARCH ON NUTRITION AND PRIMARY HEALTH CARE SERVICES

It is certain that the research in Nutrition has constituted a very important instrument for the growing and objective knowledge on the magnitude and characteristics of the nutritional problems, as well as on their consistence with the structure and operation of the organism and on its growth and development, and the implications, in short and long periods, that malnutrition has on the individual and the society. In addition, the research has made it possible, to systematize and refine the nutritional diagnosis, to improve the schemes of individual treatment, to develop some methodologies of action, -and that which has been of extraordinary importance-, to raise the level of awareness and to motivate the community and the governments on the severity of the problems and their repercussions, and on the pressing need for their solution. Nevertheless, the magnitude and importance of the problem demand immediate action, for which formulation and implementation a change is required in the orientation of nutritional research leading to a greater emphasis on the elements of immediate application in order to orient and to evaluate preventive and corrective actions. Although it is recognized that the fundamental solution to nutritional problems can be reached only through structural changes in the organization of the society that involve poverty and social inequalities elimination while a sustained economic development is generated, it is also certain that, while this long-term objective is being reached, it is imperative to act immediately to protect the current generations within a short period by actions with sufficient impact for the purpose of diminishing significantly the magnitude of the problem and of preventing a greater damage to the vulnerable groups exposed to malnutrition. The majority of these emergency actions correspond to the health sector and finds in the primary health care services the most expeditious means to get to the target population. In reality, the operacionalization of the component of nutrition of primary health care offers an exceptional opportunity for the development of action-oriented research on nutrition.

In the first place the role that the primary health services performs as motors and catalysts of community organization is fundamental, and its active participation is absolutely necessary for the search and implementation of solutions to its own problems, as is suggested by the frequent failures of programs imposed vertically on the community and in which the latter changes into a simple passive recipient or beneficiary.

On the other hand, the principal strategy of the health sector at the present time refers to the fundamental purpose of extending the coverage of primary health care services, embraced by the majority of the developing countries, as an immediate response to the need of protecting the health of the majority of the population tending to prevalent morbidity with both preventive and assistant actions.

Furthermore, primary health care offers the ideal opportunity for the development of a broad gamut of direct actions on the population at risk of nutritional problems, which operacionalization should be the object of systematic investigative action, for the purpose of developing methodologies and appropriate technologies for its appropriate implementation, to guarantee maximum effectiveness and efficiency. This is how operations research on the provision of comprehensive primary health care services constitutes the basis for the development of action-oriented research on nutrition.

Although many consider primary health care as an instrument of development more than an element of provision of health services, it is doubtless that the field of action of the primary health worker is necessarily limited, as much in the number of actions as in their complexity and time available in order to carry them out; this obliges the selection of those that offer the greatest prospects of effectiveness and to design and test effective methodologies of service delivery, even more in the specific field of nutrition, which constitutes only one of the multiple problems that should be attended to.

Action-oriented research on Nutrition within the package of primary health care has immense possibilities and prospects in Colombia, since the National Health Plan has taken the expansion of coverage of the primary

services as a basic strategy, one fundamental objective of which is the control of the principal health problem of the country: the complex malnutrition-infection. Furthermore, the fact that a great proportion of the actions of PAN is executed through the primary care services, makes the development of an aggressive program of action-oriented research especially relevant and necessary to provide the elements required in optimizing the efficiency of the actions that constitute the nutritional component of primary care.

The possibilities and needs of action-oriented research in this field are numerous, some of which are especially relevant within the context of the Colombian Nutritional Situation. The following fields can be pointed out:

- Alternatives of improving practices of infant feeding through actions integrated with primary health care, within the existing economic restrictions.

- Simple and practical methods of evaluation and follow-up of the nutritional state of the children for use in primary care.

- Effectiveness of strategies and actions for promotion of natural lactation.

- Appropriate technology for the improvement of the nutritional quality of traditional foods.

- Best age to introduce foods to supplement maternal milk, under different ecologic conditions.

- More appropriate diets through episodes of disease, especially gastrointestinal, and in the period of convalescence.

- Techniques of modification of the behavior regarding infant feeding.

- Integration of actions of nutrition and of prevention and control of infections and diarrheas in primary care and their effect on the nutritional state of the children.

- Evaluative research on the impact of interpersonal education for the improvement of infant feeding practices.

- Appropriate technologies for the preservation, management and preparation of foods in the home, especially weaning foods.

- Simple indicators of nutritional risk to be utilized by the primary health workers.

- Methodologies of nutritional education in order to seek changes in knowledge, attitudes and food practices.

- Strategies, contents and techniques of training of the primary health worker in activities of nutrition.

- Minimum Contents of the component of nutrition within the package of primary health care.

- Methodologies of organization, motivation, awareness building and work with the community, for use by the primary health worker.