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**COMMUNITY-ORIENTED HEALTH, NUTRITION
AND FAMILY PLANNING SERVICES: OVERVIEW
AND LESSONS FROM OPERATIONS RESEARCH**

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INTRODUCTION

The 1980s have seen an increased interest in the fields of international health, nutrition and population/family planning. There is an unusual opportunity for great progress to be made in these fields before the turn of the century.

It is discouraging at times to realize that so much more could have been accomplished already in these fields without the need for new or sophisticated technology. At the same time, one can look optimistically to the future, because we do indeed have the opportunity and the know-how to improve programs significantly and, in so doing, to contribute in important ways to the health and well-being of people throughout the world.

There is thus a growing interest in the delivery of integrated basic health, nutrition and family planning services. The following is a review of some of the key issues and problems in these fields, including discussion of program experiences, suggestions about some of the future opportunities and examination of the role of research in this process.

THE PROBLEMS

Despite the high rates of urban migration currently found throughout the developing world, many countries, particularly in the African region, remain predominantly rural societies. As a result, attention will be focused on such areas, although it is important also to consider program needs in the growing urban slums of the larger cities in the region.

In most of the countries in Sub-Saharan Africa, the 70-90 percent of the people who still live in predominantly rural areas

have little or no access to modern health services. Although there clearly have been some improvements in health care in many of these areas, it remains true that infant mortality rates are as much as 3-10 times higher than those in the developed world, and preschool mortality rates are as much as 250 times higher than rates in the West.¹

In many countries of this region, as much as 20 to 65 percent total mortality occurs among children under the age of five, as compared with two percent for a Western country such as France.² Infant and childhood mortality rates have fallen since World War II, resulting in increased levels of population growth, but the modern health care system probably has contributed relatively little to the declines that have taken place to date.

The major causes of mortality among children are not exotic, hard to diagnose diseases, but very common conditions that have been the primary causes of mortality among children throughout history. The levels of mortality on the African continent today are not dramatically different from those that existed in the United States at the turn of the century.

The most common causes of death among infants and preschool children are gastrointestinal or diarrheal diseases, respiratory and other infectious diseases, all complicated by varying degrees of malnutrition.³ As will be discussed below, the technology to treat and manage these conditions has been available for many decades, and it is a condemnation of the priority-setting for program development of most governments and many donor agencies that more has not been accomplished since World War II.

Even worse, maternal health has been essentially neglected. The vast majority of women in the African region deliver their babies at home, assisted sometimes by traditional birth attendants, sometimes by relatives and often by no one. Levels of maternal mortality are as high as 100-1,000 deaths per 100,000 live births, as compared with only 12-14 per 100,000 in Western societies.

The World Health Organization (WHO) has estimated that throughout the world each year some 57 million women will deliver babies at home without appropriate intervention; as a result, using conservative estimates, the WHO projects approximately 500,000 deaths per year.^{4,5} This situation is particularly acute in the African region.

Two cases can serve to illustrate the types of problems so commonly seen. Mrs. Adeola began labor, planning to deliver her child at home, as she had done in the past. Of her six previous children, four were still living; two died in infancy from illnesses for which she did not know how to provide care. She was 34 years of age and had lived in the same village in Africa all of her life. As in the past, her elderly aunt delivered the baby, although Mrs. Adeola had gone to the government midwife for a checkup two months earlier. The labor and delivery were easy, since Mrs. Adeola was a good patient in labor. The baby was delivered, an apparently health male. The placenta, however, did not come easily, and the aunt became concerned. Mrs. Adeola began to bleed heavily; the government midwife was called. When she arrived, 45 minutes later, Mrs. Adeola was pale and still bleeding. The midwife attempted to massage the uterus, but she

had no appropriate medications with her because she was not allowed to give medications by injection. She then attempted to remove the placenta manually, but it tore, and only part of it was removed. Mrs. Adeola continued to bleed heavily, and an attempt was made to move her the 40 miles to the nearest health center with a physician. However, in transit, Mrs. Adeola died from blood loss. An injection of Pitocin or ergotrate might well have saved her life, but in Mrs. Adeola's country, only doctors are supposed to give such medications.

Yeni was a two-year-old infant. She was quite thin and short for her age when seen by a government-trained midwife. She had had several bouts of diarrhea, but until this episode, they had cleared up spontaneously. For the previous two or three days, however, she had had increasingly severe diarrhea, and her mother brought her to the health center. The midwife gave the mother some advice and some white liquid that was supposed to decrease the diarrhea. She noted that the child appeared to be quite severely dehydrated, and recommended that the child be taken to the nearest hospital, about a 25-mile trip; but there was no transportation available. By the next day, the child had died of dehydration. Institution early of oral rehydration or, in later states, administration of intravenous fluids would have tided Yeni over this particular illness, and better health education might have been able to improve her nutritional status, since preexisting malnutrition was probably a major factor leading to her demise.

Despite the continuing high levels of mortality, death rates

have, indeed, fallen over the past 35-40 years, while birthrates have remained quite high. As a result, the African region is now experiencing a rate of population growth that is unprecedented. Kenya, with a population growth of approximately 4.1 percent, has the dubious honor of having the highest population growth rate of any country in the world. The growth rate for all of Africa is 2.9 percent and many countries, including Ghana, Liberia, Nigeria, Tanzania and Zimbabwe have rates over 3 percent.⁶

While the percentages are not large, their implications are extraordinarily important. The basic demographic fact is that at a growth rate of 3 percent, the population doubles in just 23 years. For Kenya, with its growth rate of 4.1 percent, the doubling time is only 17 years. Nigeria, at 3.1 percent, will double its estimated population of 91 million to 182 million by the year 2008 unless the rate decreases.

INTERVENTIONS

What do we know, and how can we expand services geared to helping solve the problems described above? The vast majority of infant and childhood deaths are not difficult to treat; rather, the triad already mentioned of diarrhea, respiratory infection and malnutrition can be managed with available technology.

In the short run, work such as that of the International Center for Diarrheal Disease Research (Formerly the Cholera Research Lab) in Matlab, Bangladesh, has more than adequately demonstrated the effectiveness of oral rehydration therapy in lowering morbidity and mortality through early intervention in

children with diarrhea.^{7,8} While this approach does not affect the basic cause, providing early rehydration will decrease much of the morbidity and mortality secondary to diarrheal diseases. In the longer run, improved and universal sanitation, as well as reduction in overall levels of poverty, will contribute to a lower incidence of diarrheal diseases overall.

Respiratory infections, another major killer of young children, can also be managed with currently available technology. Through the use of a simple checklist, workers can be trained to treat these conditions relatively early with an appropriate antibiotic. More effective immunization programs would contribute to a decrease in other infectious disease.

As noted, malnutrition dramatically complicates these infectious diseases, and a vicious cycle is established. In the past, too much reliance was placed on provision of foodstuffs from outside. With the exception of those areas in which there is extreme famine, authorities are increasingly looking for ways to assess local foodstuffs so that better use can be made of available resources rather than increasing dependency on external sources. Growth monitoring is an important component of a nutrition program, helping to assess progress.

In comparison with infant and child care, village-based strategies to improve maternal care are somewhat more difficult to structure. Major causes of mortality among women include such conditions as postpartum hemorrhage, infection, uterine rupture, toxemia of pregnancy, and illegal abortion. In Africa, problems of obstructed labor are common resulting in uterine rupture, bladder-vaginal fistulas and death.⁵ At the village level, more

relevant screening efforts can be undertaken to attempt to identify those women who are at high risk of maternal complications; but until institutionalized services are available, there will not be a dramatic impact on maternal mortality through village programming.

However, at least in the short run, there is one intervention that can be uniquely effective. That intervention is family planning. There is now a very strong scientific base to document the fact that spacing, age and the number of children a woman has had are of key importance to her own health as well as to that of her children.⁹

Given the difficulties and long time frame needed to develop institutionalized maternity care, family planning programs may have a more profound impact on maternal, as well as child, health than any other single intervention, at least in the short run. While much of the available data are related to mortality, it must be remembered that for every maternal or infant death, there are far more women and children who have had serious problems, but have survived, often in sickened, weakened or handicapped states.

For the child, perhaps the most important single factor is the length of the interval between births. Traditional practices of breastfeeding and postpartum abstinence have been used throughout the world for spacing in order to safeguard the health of children and as long ago as the early 1920s, studies in England and Wales and the United States demonstrated higher infant mortality when birth intervals were short.¹⁰⁻¹²

Recently, World Fertility Survey (WFS) data from many developing countries have given conclusive evidence of the dangers of close spacing. The increase in infant mortality with inadequate spacing is substantial, being over 50 percent in all but one of 26 countries surveyed. In the majority, it was over 100 percent. Studies showed further, that too short an interval not only raises the infants's chance of dying during its first year, but also affects the child's survival chances for at least the first five years of life. These effects are independent of maternal age and birth order.

Finally, while economic conditions certainly influence child mortality, they are not responsible for the association between short birth intervals and increased mortality. This increase is seen regardless of maternal education and area of residence.¹³⁻¹⁶

Family planning also brings about substantial improvements in maternal health. Women who have many children or who give birth early or late in their reproductive years have a greater chance of dying of pregnancy-related complications than do other women.^{9,17} With the WFS data from eight African countries, the percentages of maternal deaths that would be averted if all women who say they want no more children were using effective contraceptives may be estimated. These range from six percent in Nigeria to 28 percent in Egypt.¹⁸ Deaths associated with illegal abortions could be almost entirely prevented if women were provided with safe alternatives.

Given these maternal and child health considerations and the demographic issues described, clearly the first intervention is to make family planning services as widely accessible and

available as possible. The experiences in Asia during the 1960s and 1970s, and in Latin America in the 1970s, have demonstrated the popularity of the concept of either spacing or limitation once access problems have been solved.

In Thailand, prevalence levels in the early 1960s nationwide were estimated to be close to 3 percent. Currently, only 20 years later, the overall prevalence of contraceptive practice exceeds 60 percent. Low-income rural women are practicing family planning at levels now comparable to middle and upper-income women of the urban areas.¹⁹

Such changes in Thailand--as well as in South Korea, Taiwan, Indonesia, several Latin American countries and, perhaps most dramatically, the People's Republic of China-- have now demonstrated beyond doubt that family planning services can indeed be accepted and even popular in areas in which little or no socioeconomic development has taken place.

In much of Asia and Latin America, the WFS has demonstrated that a majority of women surveyed express a desire for no more children; the proportion rises to levels as high as 80 to 90 percent among women who have had four or more children already.²⁰ Preliminary data from African countries suggest a similar interest among all women of reproductive age, albeit at a lower level. About 15 to 20 percent express a desire not to have additional children. This percentage rises to higher levels among women who have had four or more children already, although it never approaches the levels that have been seen in parts of Asia. For example, among women 35 and older, and/or with four or

more children in Kenya, the Sudan and Lesotho, 47 percent, 48 percent, and 31 percent respectively, do not want more children.¹⁸

In addition to the provision of contraceptive services, there are other interventions that are important for lowering growth rates. Many of the world's lessons in these areas come from the People's Republic of China, where the age at marriage has increased, the status of women has been dramatically improved, literacy is almost universal and other socioeconomic advances have taken place.

INTEGRATED PROGRAMS

For many years, the field of health has been committed to the concept of integrated health care services. Unfortunately, for a variety of complex reasons, in the past the commitment to and implementation of integrated programs has been far less successful than desired, particularly for the poor living in rural areas and in urban slums.

Since World War II, death rates in most developing countries have fallen rapidly; however, it is fair to state that the major contributions of government-run health programs to this decline have been not from integrated programs, but from vertical ones.

Such programs, which usually utilize their own personnel, assign tasks limited to the goals of the specific program. Special efforts, such as smallpox and yaws programs, have been dramatically successful, eradicating smallpox and virtually eliminating yaws.

Malaria eradication programs have been among the most ambitious and, to a certain extent, the most successful vertical

program efforts in history. Clearly, the goal of malaria eradication has not been met; but in terms of the organization of personnel and the meeting of the intermediate objectives of surveying every village and spraying every individual household, this goal has been met to perhaps an unprecedented degree. Until relatively recently, far and away the most accurate maps of individual villages in most developing countries have been available in the malaria eradication offices rather than in statistical offices of the government.

A major problem in malaria programs has been the attempt to integrate their personnel and programs into broader health activities, in most instances without success. A significant factor has been the lack of an effective health infrastructure with which to integrate.

Immunization programs, sanitation efforts and other programs have likewise been achieved most commonly as single-purpose efforts. Similarly, the more successful family planning efforts in Asia have, in general, been of the vertical program type, even though some have made use of health infrastructures where they are present.

Indigenous practitioners of varying types, most untrained in the modern sense, and most outside the official structure, also have contributed to improved health status in a variety of ways, often making use of modern medications.

Despite the long-standing interest in, and obvious attraction of, the concept of integration of a broad range of health and family planning activities together with even broader

overall development efforts, there have been few documented successes to date in most of the developing world. Rather, the differentials between the affluent and the poor, including access to and utilization of health care, both between countries and within individual countries, appear to be growing worse rather than better. There are, of course, a few exceptions where successes in providing health and family planning services to a majority of the people have taken place in the context of broader socioeconomic development efforts.

Maternal and child health programs are an example of a major integrated health effort identified many years ago, by both the WHO and most ministries of health, as a high priority. Until very recently, however, most programs in this area have been judged unsuccessful, at least as measured by the high percentages of rural women still being delivered at home and by the lack of access to the most basic of health services for many children.

Medical conservatism, or the insistence (until relatively recently) on care provided primarily by physicians, has contributed significantly to this problem. Many developing countries have adopted far too many practices from Western medicine without appropriate and relevant adaptation. Our medical system is based on an urban, medical center, physician-oriented model that has had a detrimental impact on health care delivery in most developing countries. In addition, political will, economic support, and general policy-related comprehension on the part of the government have been lacking.

In the United States, there are approximately 700 people per physician, compared with an average of about 1,000 people per

physician in other Western nations. In this Western model, the physician focuses on treating diseases, not on preventing disease.

In the developing world, the ratio of people to physicians is far higher than in the West, a situation that is usually exacerbated by the fact that the great majority of physicians are located in the larger cities. In rural areas, where the majority of people live, the ratio of population to physicians may be as extreme as 40,000 to 200,000 to one.²¹

Despite these grossly adverse ratios, many developing countries have initiated programs in which most, if not all, curative services are provided by physicians. This results in the denial of care to those most in need, and, therefore, the majority of the world's population have had little access to the most essential kinds of health and family planning care, despite the dramatic scientific and technological advances that have occurred during the past four or five decades.

Recently, based on the model of China and some earlier program experiences in Africa, major changes have taken place, and varying levels of personnel have been given more relevant jobs to perform, jobs that often had been reserved for the physician. It is interesting that family planning programs have taken the lead in introducing a number of key innovations.

In Indonesia, for example, field workers of the National Family Planning Coordinating Board, which has organized village-level services, have succeeded in reaching the rural population far more effectively than had the Ministry of Public Health with

its varied centralized health programs. Currently in Indonesia, an experiment is under way in the introduction of simple health care services into the widespread and successful family planning program. It will be useful to watch this process both to see how effectively the integration can take place and to see the impact of multiple jobs on the performance of the original family planning workers.

RESEARCH

Research has been important in exploring new approaches to the delivery of health, nutrition and family planning services. In the past, a number of long-term projects have been developed, the most well known of which include Narangwal, Danfa and Lampung, as well as the four so-called Taylor-Berelson projects in Indonesia, Turkey, Nigeria and the Philippines.

Each of these projects has had a relatively complex design, including plans to assess both intermediate and final outcome measures. In each case, a large outlay of money, time, and personnel was required, as was a time frame of at least 5-7 years before final outcome measures could be adequately assessed. Unfortunately, governments rarely are willing to wait that length of time to make decisions, and often questions raised in the research design are in effect answered by government policies implemented long before the project is completed.

In addition, because of political situations that exist within health care systems in many settings, the time frame is so long that different authorities are in power when the project is completed than were at the time of initiation. As a result, assessments of project results often are not in scientific terms,

but in political ones.

Most of the long-term projects mentioned above have certainly increased our understanding of many important issues in the field, but, in general, they have not had the desired impact within the country concerned in terms of replicating the lessons learned on larger scale. Unfortunately, a bias has developed against pilot or demonstration research efforts because of the perceived lack of relevance for national replication of these and other projects.

More recently, shorter applied or operational research efforts have been developed in which the research designs are somewhat less rigid than those of some of the long-term projects. The time frames are much shorter, and in most cases, the projects are smaller and less ambitious.

For the last several years, the Center for Population and Family Health (CPFH) at Columbia University, with support from the United States Agency for International Development, has been involved in a number of operations research activities, and several important lessons have been learned in this process.

The studies to date have been focused predominantly on the development of more appropriate approaches to the delivery of services to rural populations. Some of the efforts have been single-purpose, but most have been integrated efforts involving family planning, health and nutrition interventions. The research has attempted to diagnose existing service delivery problems, to propose and help implement possible solutions or alternative approaches, and to carefully assess and evaluate the

efforts. The following are some of the findings we have felt to be of importance.

1. Such projects are best developed in a relatively small project area with members of the community and of the local health care agency involved in all aspects of planning, implementation and evaluation. Winning the trust of the community and demonstrating that the program is, indeed, geared to their needs is an essential first step. Without this collaborative effort from the onset, the project will be faced with major difficulties.
2. Planners must be ready, despite the research design, to discontinue components of the project that appear not to be working at an early state in the project, or to make significant modifications as indicated. One advantage of the operations research approach is the lack of rigidity of research design, allowing for modifications so that the effort remains practical in orientation.
3. In some projects, quasi-experimental research designs are possible. In others, a simple demonstration project involving an approach tried elsewhere is worthy of trial.
4. When it is decided that the project will be an integrated one, it is essential that priorities be determined and only a small number of interventions be selected. Experience suggests that at the village level, programs attempting to implement a wide range of interventions are probably doomed to failure and that there-

fore these interventions should be limited to three or four, such as distribution of nonclinical contraceptives (including the pill), education about oral rehydration and distribution of oral rehydration packets, nutrition education, and perhaps one or two others. In the Sudan, for example, family planning services have been introduced in association with oral rehydration, nutrition education and vaccinations.²²

5. It appears useful to carry out the training for such activities in short segments through phasing. In Nigeria this consisted of three weeks of intensive training on the village level in maternal and child health, followed by a two-month period of practice and a second phase of training for family planning and environmental health services.²³ In the Sudan project the first training course concentrated on oral rehydration therapy. The second, several weeks later, reviewed key elements of ORT, then focused on nutrition. This approach is continued until all of the interventions are underway.²⁴ In-service training thereafter is in order. The amount of didactic material in the training programs is kept to an absolute minimum and practical elements of the intervention are stressed through role play, repetition and practice.
6. Supervision remains one of the most difficult areas in field programs, and operations research presents a unique opportunity to assess different approaches. A

basic concept that has appeared to be of key importance is that the supervision needs to include actual observation of the workers in their activities and not simply a review of paperwork or data in general.

7. Illiterate workers can be highly effective in relating to their peers in the village and should not be ruled out simply because of their illiteracy. Over and over in the past, the importance of record-keeping and data collection has been over-stressed, resulting in educational requirements that often are unrealistic. Far more important is the ability to understand and work well with local villagers, and in some areas, the educated worker may be less relevant than one who has not had access to such education. The CPFH has experimented, as have others, with the development of special pictorial record forms for illiterate workers, and there is now increasing evidence that such records can be of much utility.²⁵

8. Through these projects, the health field has learned that a wide range of personnel -- including nurses, midwives, auxiliary workers and lay villagers--can carry out a variety of health care activities that were limited in the past to more highly trained workers. Activities have included prescription of oral contraceptives, insertion of IUDs, provision of oral rehydration salts, distribution of various medications (including, with appropriate checklist and control, antibiotics for the management of respiratory and other

infections), and the provision of simple first aid. The Chinese have been among the leaders in this concept, but through pilot as well as national efforts more countries are developing programs geared to this concept.

9. Effective projects and innovative program strategies can be developed and implemented utilizing special groups such as a variety of women's organizations, cooperatives and factory groups. In Bolivia, for example, factories and unions are becoming centers for the provision of information and counseling about family planning services.²⁶
10. Social marketing programs, which build on marketing techniques, can be most effective in distributing key commodities and implenting program interventions. The social marketing field has been highly effective in some countries in distributing oral and other contraceptives, and there is an interest in using this approach for the distribution of oral rehydration salts as well.
11. The evaluation should be geared toward intermediate outcome measures such as services accepted, drugs or commodities distributed and contraceptive prevalence levels. Reasonable conclusions can be drawn from these intermediate measures in 18-24 months, a period that is too short for the achievement of longer term objectives such as changes in fertility, mortality and morbidity.
12. The microcomputer revolution has been of great importance in the more rapid processing of ongoing

service statistics and various surveys. Through this technology, the data can be used for ongoing management purposes with rapid feedback to both the field workers themselves and the higher level authorities. In Haiti, microcomputers are being used to analyze data from operations research activities being undertaken by the Division d'Hygiene Familiale and Cite Simone. In Nigeria and the Sudan, local staff were trained to enter and analyze baseline survey data for expansion projects; as a result, preliminary reports were available within weeks of survey completion.²⁶

13. In addition to the more standard survey and service statistic systems, a variety of new approaches have been developed as a part of these projects that will play important roles in the future. These include the use of such qualitative tools as focus research groups and process assessment, as well as simpler survey instruments such as the minisurvey concept, in which small surveys are carried out on an ongoing basis either by specially trained workers or by the field workers themselves.²⁷

While this is only a partial list of the conclusions the CPFH has drawn, this area is an exciting one, which will continue to help move the field more rapidly into the future than has been possible. In some of the projects in which the CPFH has been involved, there has been larger scale replication of key aspects. This has been particularly evident in projects which the Center

has collaborated with the Mexican Ministry of Health, the Department of Family Hygiene in Haiti, the Ibadan University and Oyo State government in Nigeria, and the University of Khartoum and the Ministry of Health in the Sudan.

In each of these cases, small community-based efforts have already been expanded to to larger areas within the state or province , or on a regional or state level. In Mexico, the approach using community workers to provide Family Planning/Maternal Child Health services was incorporated into the Ministry of Health programs soon after the CPFH pilot project was initiated in 1977.²⁸ In Haiti, the success of household distribution of contraceptives (initiated as a pilot study in three rural communities in 1978) led to incorporation of family planning and community workers into a number of subsequent programs throughout the country.²⁶ In Nigeria, an integrated community-based program in one region of Oyo State was expanded into a State Health Council project, and it is currently influencing the development of programs throughout the country.²⁹

It is indeed a rewarding experience to see a small project have an impact at the end of 18-36 months on either national or state-level programming. As more and more governments attempt to implement primary health and family planning programs, in both villages and urban slums, the importance of short-term applied operations research, including demonstration efforts, becomes increasingly evident. Furthermore, such efforts will play a major role in the next decades, as countries attempt to meet the ambitious goal expressed by the WHO of health care for all by the year 2000.

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