MEDICAL EDUCATION IN THE CONTEXT OF DIARRHEAL DISEASE CONTROL

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BACKGROUND

At the heart of the efforts to control diarrheal disease is the competent assessment and treatment of children with diarrhea by physicians and other practitioners. Given the prevalence and importance of diarrhea in most developing countries, the schools that train physicians, nurses, and other practitioners should be particularly effective at ensuring that their graduates do perform this function correctly. Yet in many countries, even new graduates use antidiarrheals or antibiotics instead of oral rehydration therapy (ORT), fail to advise on feeding during the illness, and communicate ineffectively with the mother of the sick child. This paper describes the efforts to deal with this problem during the 1980s, in particular the activities in which the PRITECH project was involved. Assessing the progress that has been made, the changing environment of the control of diarrheal diseases (CDD) field, and issues that have been identified over the decade, the paper concludes with recommendations for medical education in the context of CDD for the decade ahead.

THE SITUATION: MEDICAL EDUCATION IN THE CONTEXT OF CDD PROGRAMS

We stood talking outside the small building that housed the oral rehydration unit at the main hospital in Port au Prince, Haiti with Dr. Jean Pape, the director of the unit. We were interrupted by a woman holding a listless, obviously dehydrated, child who persisted in attempts to gain our attention. She held out a piece of paper and urged Dr. Pape to read it. It was a prescription for two bottles of intravenous fluid. The price of this prescription being beyond the mother's meager available funds, she was appealing to us for help in purchasing the fluid.

The prescription was from the hospital's emergency room nearby, run by medical students and recently graduated physicians in training at Haiti's medical school. While Dr. Pape assured me that these doctors in training had heard about ORT, clearly they were not practicing it. Had it not been for the ready availability of the oral rehydration unit to which we took the mother and child, the baby may not have survived that diarrhea episode. Oral rehydration would have easily saved the child, but it was not recommended by the freshly trained physicians of that medical school.

This experience was typical of the situation in the early and mid-1980s. There were some notable exceptions, in particular Indonesia and the Philippines, but in general correct diarrhea practices had largely failed to reach the teaching hospitals and medical school professors. For patients in that setting, fluid therapy consistent with current standards was rare: intravenous fluids were the rule, and ORT the exception.

Communication with the mother was also deficient. Diarrhea is largely a disease handled at home. In busy hospitals, patients are often sent home before diarrhea has stopped completely, while there is still the possibility of again becoming dehydrated. So the

mother's ability to manage her child's illness is critical. Yet in most medical schools there was little instruction in how to educate mothers to manage or prevent diarrhea in their children. Ineffective communication methods were used, predominantly one-way preaching; demonstration was rare. Little effort was made to check whether the mothers had understood and could mix and administer oral rehydration solution correctly. Important additional messages such as the importance of continuing to feed a child during a diarrhea episode were often omitted.

A third major concern was the lack of preparation of graduates to manage CDD activities in and out of community health centers. In many developing countries new medical graduates are required to serve a period of duty in a government community health center, often in isolated rural areas. Yet few medical schools at that time provided adequate teaching to their students in tasks such as managing the clinic, setting up an oral rehydration corner, teaching members of the health team or community health workers about ORT or preventing diarrhea, or managing a CDD program.

The situation in medical schools was largely duplicated in nursing schools, many of which used medical school teaching hospitals for clinical experience, and provided minimal community or ambulatory clinic experience.

National CDD programs at this time focused primarily on case management. They devoted much of their effort to training physicians and other health workers already working for government health services. Medical education was considered a difficult target, complex and slow to change, and had been largely ignored by CDD program efforts in the early 1980s.

An important component of CDD training efforts in the mid-1980s was the formation of diarrhea training units. These were facilities within a hospital in which correct diarrhea case management and good communication with patients and their parents were taking place, patient volume was sufficient to provide adequate hands-on practice for each trainee, and teachers were available to supervise hands-on learning experiences by trainees. A model for these diarrhea training units was provided by centers used by the World Health Organization (WHO) in the late 1970s to train physicians in the management of cholera. These were located in Manila (San Lazaro Hospital), Jakarta (Infectious Disease Hospital), Lahore, Pakistan (King Edward College Hospital) and Dhaka (International Center for Diarrheal Disease Research), among other locations. With increased funding for CDD from the Agency for International Development (A.I.D.) and other donors, an increased emphasis on the formation of diarrhea training units, at least one per country, was implemented.

A special case management course and supportive materials for trainers and trainees were developed by WHO. The course included five days of intensive training, with substantial hands-on experience for trainees. Follow-up by the trainers was not part of the package. Subsequently, an alternative shorter course, intended for use in smaller, more peripheral

centers, was developed, along with a package of convenient teaching materials, in order to reach more physicians in service via a multiplier effect.

Previous efforts to improve developing country medical schools had had mixed success. Overseas aid programs from developed countries had worked with many medical schools, particularly in the Indian subcontinent and Africa. Their inputs had often been quite substantial, with visiting professors living in the country for many years. They often utilized professors from the sponsoring developed country as external examiners, and emphasized meeting developed country "standards", rather than orienting the teaching to the rather different reality of local disease problems and resource-poor facilities and manpower. These efforts had produced graduates who were often well prepared to work in the sponsoring developed country, but less well prepared to handle the problems of their own health system and communities. This experience was worrisome to donors, who feared that schools would be both difficult to change, and not oriented to their surroundings.

WHO also assisted countries in improving medical education. One example was Indonesia, where WHO conducted workshops on medical education at the national level for deans and leading faculty members. These workshops often stressed planning medical education to respond to local health problems, defining goals and specific behavioral objectives, and providing practice for faculty in alternative teaching techniques. WHO consultants then followed up at individual medical schools in developing a locally appropriate plan. Consultants also provided input on improving the quality of teaching, specifically by expanding the range of teaching techniques beyond the traditional lectures and ward rounds. These efforts introduced many new ideas, but in many cases failed to change significantly the fundamental nature of the ongoing educational process.

The Rockefeller Foundation's Education for Development Program provided long-term visiting faculty members and advisors to institutions such as the University of the Philippines, Mahidol University in Thailand, and Gadjah Mada University in Indonesia. Rockefeller's commitment was long, typically up to 15 years, and included support for degree training of young faculty members outside the country. At Mahidol University, Rockefeller Foundation supported every level of medical education, including basic science. Mahidol became a university functioning competitively at international levels in high-technology medical research, but perhaps less effectively in responding to the needs of the Thai health problems and communities. In contrast, the Gadjah Mada Indonesian project from the beginning aimed at community related objectives, and emphasized activities either in the community or aimed at community efforts and health center problems. This emphasis resulted in an educational process more relevant to the Indonesian situation.[1]

Despite some successes, the overall impression from these and other experiences was that long-term involvement and substantial expense would be needed to bring about change in

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[1]Robert Northrup, "Teaching Community Medicine to Doctors: Observations on the Gadjah Mada Experience," *CMS Bulletin*, no. 24, October 1977.

medical education, and success might not occur. Medical education appeared to be a doubtful investment with a low yield. As a result, when considering interventions to change practitioners' management of diarrhea, program resources were largely devoted to training doctors already on the job, a short-term activity with more immediate impact. While the development of diarrhea training units involved some medical schools, there was not, during the early 1980s, a systematic attempt to work with medical schools to improve the knowledge, skills, and attitudes of the graduates regarding the control of diarrhea or the management of diarrhea cases.

In the fall of 1985, the WHO CDD program summoned a task force of experts on diarrhea and medical education in Geneva. After a week of deliberations they concluded that the students' direct experiences with diarrhea patients are the most important influence on their subsequent behavior. They recommended that efforts be oriented toward improving the teaching during the clinical years, primarily through ensuring actual involvement with patients with diarrhea. This involvement should occur in a setting where correct diarrhea treatment is taking place and the professors model appropriate behavior for the students, as in a diarrhea training unit. Each teaching hospital connected to a medical school should have a DTU.

The group specifically decided to de-emphasize pre-clinical teaching, feeling that, although preclinical lectures provided an important base for clinical activities, their impact on actual graduate behavior was minimal. They recommended that every medical student be required to have demonstrated competence in diarrhea management with actual or simulated cases in order to graduate: showing knowledge by written exams alone should not be considered satisfactory. To achieve this they recommended that more active teaching/learning methods be implemented, and that aspects of case management about which doctors make frequent errors should receive extra stress—unnecessary use of IV therapy, insufficient feeding during diarrhea, and poor communication with the mother, for example.[2]

ACTION TO ADDRESS THE PROBLEM

Based on these recommendations, WHO and AID collaborated through the PRITECH Project to design practical learning activities related to diarrhea for medical schools and to produce a package of teaching/learning materials to support those activities. The materials were primarily oriented toward diarrhea case management. Initial plans had included objectives and related materials for community-related CDD activities, but these were not carried forward.

The package of medical education materials which was produced by that effort consisted of the following:

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[2]Robert Northrup, "Enhancing Medical Education for Diarrhea Control (MEDIAC)," in *Proceedings of Biennial Meeting of Indonesian Pediatric Gastroenterology Coordinating Board (BKGAI)*, Jakarta, 1989.

1. A book of readings on diarrheal disease, for use by students and teachers.

2. A "library" of teaching/learning activity descriptions assembled into a large looseleaf notebook. Arranged by topic according to a suggested sequence of teaching, each activity had its own set of materials. These included objectives, teacher preparation, detailed descriptions of the actual activity (e.g. questions and answers for a discussion), and content materials where appropriate, for example, detailed contents of a lecture on the pathophysiology of diarrhea, or the components of good communication techniques between a doctor and the mother of the patient.

3. A student workbook, consisting of cases, discussion points, questions, and other components from the library of learning activities, assembled into a single notebook for use by the student.

4. An evaluation book, consisting of more than 100 multiple choice and other written exam questions (for written or verbal assessments), keyed to the learning activities and topics.

5. A collection of published references supporting the major scientific points of the curriculum, bound together for easy use by both student and faculty member.

Activities from this medical education package were introduced in Pakistan, the Philippines, and Indonesia prior to 1988, and the full package was piloted in both the Philippines and Indonesia.

In 1988 the completed package of materials was reviewed by a task force at WHO/CDD. They recommended revision prior to further trials. This revision was completed in 1992. Again, portions of this version were piloted in Vietnam, Nigeria, and India, prior to the completion and publication of the whole package.

Pakistan Experience

In 1987, Pakistan launched an intensive project to train physicians in government health service in CDD, with support from USAID and WHO. While the trainees were not medical students, the trainers and DTUs involved were the faculty members and hospitals of the leading medical schools in all regions of the country.

An initial workshop with faculty was held in Lahore. The draft materials from the PRITECH-WHO collaboration along with the newly completed package of WHO materials for diarrhea training units became the basis for a standard training curriculum to be taught in each of the eight diarrhea training units around the country. USAID provided support for purchase of necessary audiovisual and other equipment, and for faculty and trainee expenses.

In regard to medical education in diarrheal disease management, Pakistan suffered from a major handicap: pediatrics did not have its own examination, but was included in the internal medicine examinations. Accordingly, medical students typically did not attend pediatric lectures or go to the clinical wards. In 1992, however, a formal decision to give pediatrics its own examination was taken, allowing pediatrics for the first time to attract some student attention. It is anticipated that the experience the faculty members have had with the teaching techniques adopted for the DTU training programs will affect the new teaching of medical students. This has not yet formally taken place, however, and teaching activities directed at medical students are still largely traditional and ad hoc with substantial differences among institutions. A national project to improve medical school diarrhea education is being planned in collaboration with WHO/CDD.

Pilot Experience in the Philippines

The first site where the medical education pilot materials received a full fledged trial was the Philippines. Prior to 1988, the Philippine Pediatric Society and the Association of Philippine Medical Colleges had been working together toward enhancement of teaching, specifically in the area of diarrhea. A textbook on diarrhea had been prepared, which covered in detail the scientific and clinical aspects of diarrhea. In addition, the pediatric society had already initiated a program of workshops on diarrhea case management for community practitioners, carried out around the country by society members.

The medical education materials were initially introduced at a one-day workshop in Manila organized for representatives from six medical colleges, to review and discuss the approach being used by the WHO/PRITECH team. While the materials had not yet been completed, they stimulated lively discussion, and interested the participants in further activity.

Subsequently, a more extensive workshop was planned to introduce the materials formally. This six-day workshop combined a brief clinical workshop emphasizing hands-on involvement with diarrhea patients with a workshop on teaching methods. The initial clinical component provided an ideal opportunity for the pediatric departmental chairpersons and faculty members attending the workshop to experience directly the more active teaching/learning methods (such as demonstration and role play) recommended by the medical education materials. Six medical schools—five from Manila and one from Cebu—participated. A number of the participants commented that this was the first opportunity they had had as faculty members to learn about and discuss teaching methods formally. The final activity of the workshop was for the participants to prepare a plan for introduction of the medical education materials and teaching methods in their own medical schools.

Most of the participants then conducted faculty training workshops in their own medical schools, made changes to their facilities so that they could meet the requirements of a diarrhea training unit, and implemented a new sequence of diarrhea teaching/learning activities incorporating the medical education recommendations. An external evaluation

carried out some months later indicated that teaching about diarrhea had substantially improved.

Subsequently, the medical education materials were introduced to faculty from the remaining Philippine medical schools through similar workshops. As of 1992, all 26 Philippine medical schools had participated in such workshops. Implementation of the new teaching methods will be assessed in an external evaluation to take place in 1993.

Pilot Experience in Indonesia

Indonesia, the second pilot location, has an active group of pediatricians who formed the Indonesian Coordinating Body of Pediatric Gastroenterology (BKGAI) in 1974. In the early 1970s, ORT and proper diarrhea case management had been introduced and strongly promoted within pediatrics. BKGAI had also worked very closely with the national CDD program in dealing with technical as well as programmatic issues impeding the spread of ORT. Since many of the members of BKGAI were on the faculties of Indonesian medical schools, they were in a position to play an important leadership role in medical education regarding diarrhea, and accepted the offer of becoming a pilot test site for the new PRITECH/WHO medical education materials.

In discussions with the CDD program it was decided to focus initially on 8 of the 25 medical schools, all of which are national or government schools.

These leading schools would provide the leadership and models for the remaining schools, with support from USAID. A physician and collaborating nurse from each school went to Bangladesh, and received inspiration as well as practical experience at the International Center for Diarrheal Disease Research there. Upon returning home they established diarrhea treatment units in each of their medical school hospitals which epitomized correct diarrhea case management and communication with mothers. In contrast to the Philippine one-step approach, where the initial workshop combined training in both diarrhea treatment and teaching, the two-step sequence in Indonesia established diarrhea treatment units with model case management procedures. Only after the diarrhea training unit was well established and running smoothly were teaching skills in the faculty and teaching activities in the unit upgraded. Modeling correct practices was given greater emphasis in this approach.

A working group of leaders in the BKGAI from four of the eight schools translated the WHO/PRITECH pilot materials into Indonesian and adapted them to local aspects of diarrhea case management (using the local name, Oralit, for ORS, for example). The same working group, in collaboration with PRITECH, then developed a training workshop to provide experience in using the materials and the teaching techniques. This workshop was held in February 1989 in Yogyakarta. Faculty participants observed and performed innovations such as role-playing, structured rounds, and teaching in community health center sites. The representatives from the eight schools also planned in detail during the

workshop which of the activities and materials from the library they would use, and how they would incorporate them into their curriculum at home.

Over the next few months, this implementation took place, usually involving a workshop for other faculty members conducted at each school. About a year later, an evaluation was carried out with visits to each of the eight schools, culminating in a review meeting held in Bali. All but one of the eight schools had made significant changes in their diarrhea teaching techniques, and all of the schools had functioning diarrhea treatment units with model case-management methods being used.

A similar sequence was followed with the other 17 medical schools, the last phase primarily with national funding. Reports indicate that substantial changes in educational methods as well as the involvement of students in hands-on case management have taken place in most of the 25 medical schools. The national CDD program has planned an external evaluation of the effort to take place in August 1993 in collaboration with WHO and PRITECH/USAID.

Issues that arose during the Indonesian process included:

Translation and adaptation. The immense amount of work required for this made the working group hesitate before taking on the task. The resulting documents, however, were much more usable in the medical schools, as most of the faculty and students are not comfortable with English. With subsequent WHO revision of the initial pilot materials, the Indonesian CDD program has considered adoption of the new materials. The need to translate and adapt the new materials again, however, has been a major barrier to updating the existing translations.

Role and importance of pediatrics. Unlike some other countries, pediatrics is a major and fully recognized department in Indonesia's medical schools, indeed may be considered to be the most active group. This issue was not a problem in Indonesia.

Nature and amount of outside support needed. Changing priorities in the USAID health package led to a gradual decrease and cessation of support for the medical education activities prior to their completion. Despite ideal plans for intensive monitoring and follow-up, the lack of outside support has been blamed for the inability of the National CDD Program to visit and morally and technically support the additional medical schools attempting to upgrade their treatment methods and teaching activities. The Indonesian government has increasingly taken on the cost of the medical education activity, as well as the support of the Diarrhea Disease Control Unit in the Ministry of Health. Funds for an internally financed evaluation or monitoring trip to each of the 25 schools, however, have not been available.

Outside support (predominantly USAID) was used to provide a package of teaching equipment and the teaching materials for each of the participating medical schools,

including enough student readers and workbooks for two years' worth of students. This was critical in most cases in bringing about enthusiastic implementation, partly for psychological reasons, partly because of real need for the equipment (for example, overhead projectors) and materials. Clearly a grant provides more than the items it supports. It also represents both a carrot and a prod for action to take place, with increased expectations on both the donor and recipient side. It appears from the Indonesian example that the external grants provided important motivation for bringing about continuing action in each of the schools.

Organizational interactions. The key to the Indonesian success was the activist BKGAI group, consisting of faculty members and members of the national CDD program, which took the lead in identifying the problem, adapting and translating the materials, organizing and carrying out the workshops, and visiting the medical schools prior to and after the workshops. Where such an activist group is lacking, movement is much less likely to take place.

Critical also was the close working relationship between the national CDD program and the Indonesian Pediatric Association and its sub-group BKGAI. Identifying diarrhea in the early 1970s as a critical problem, this collaborative effort has included joint national meetings on a biannual basis, a program-oriented research agenda, and projects carried out by members that provided local evidence of key case management principles (e.g. lack of need for antibiotics, effect of continued feeding during diarrhea) and stimulated faculty enthusiasm. This collaborative effort has also included substantial interaction to carry policy decisions from the highest national and international levels into the medical schools, which function under a different ministry, as well as into the professional pediatric world of Indonesia. As in the Philippines, the work of these groups has been extremely important in bringing about the change that has taken place.

WHO/CDD MEDICAL EDUCATION MATERIALS

While the pilot experiences in the Philippines and Indonesia were taking place, the WHO CDD program decided to revise the materials to improve them. The objectives of the revision, begun in 1988, were to reduce the bulky original materials and to incorporate more recent technical information. Headed by Dr. Nat Pierce, the revision effort was completed in 1992. Pilot implementation of the revised materials in progress has been carried out in Vietnam, India, and Nigeria, with workshops involving all of the medical schools in Vietnam and Nigeria and five schools in India having taken place. A major additional contribution of the revision has been the preparation of a detailed workshop guide for the national-level workshops aimed at introducing faculty members to the new materials.

The current WHO medical education workshop includes hands-on clinical activities, as in the Philippine experience, but puts increased emphasis on the faculty participating as teachers. Substantial opportunity is provided for the participants to practice teaching each other to manage diarrhea cases. Reactions to the new workshop design in the three countries have been very positive.

The remainder of the medical education teaching package is currently with the publisher. The student manual, *Readings on Diarrhea*, a book of readings and exercises on diarrhea, has been published as a full-fledged WHO document. The remaining materials are produced by the WHO CDD program. The *Instructor's Manual*, a collection of detailed descriptions of teaching activities for use by teachers, provides a convenient way for teachers to obtain practical ideas for different ways to teach. The *Guide to Student Evaluation* includes a collection of appropriate questions and testing instruments. A *Workshop Director Guide* provides an agenda and operational guidelines for organizing and leading workshops for medical school teachers introducing them to the set of teaching materials and facilitating their development of plans to strengthen the teaching of diarrheal diseases at their schools. A *Workshop Participant Manual* is used by the participants during such a workshop.[3]

The teaching recommended by the materials includes (1) theoretical background for diarrhea case management and prevention; (2) hands-on assessment of the patient with dehydration, and also of more complex patients, for example those with persistent diarrhea; (3) advising and communicating with mothers; and (4) treatment of the diarrhea patient including fluids, feeding, drugs, and referral.

The two workshops in Nigeria took place in December 1990 and September 1991, and the single workshop for five medical schools in India took place in May 1992. This workshop provided an opportunity for final testing of the materials as well as the workshop strategy and methods, after which final revisions were made and the materials sent to the publisher.

The Vietnam workshops were conducted in 1990, after which the national CDD program translated *Readings on Diarrhea* into Vietnamese and distributed 5000 copies among all the medical schools for use by the students. Many students bought the book at cost.

The impact of these activities in Vietnam has recently been assessed, with visits to seven of the nine medical schools. The results showed that high priority had been given to implementation of the workplan by faculty and hospital staff. Diarrhea training units had been established and were running well in most teaching hospitals. Students spent two one-week periods in the diarrhea training unit, and received first-hand experience in case management. Their competence in acquiring the needed clinical skills was ensured by monitoring with a checklist introduced at the workshops. In addition, significant changes

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[3]World Health Organization, *Programme for Control of Diarrhoeal Diseases Interim Programme Report, 1992*, WHO/CDD/93.40, Geneva, WHO, 1993.

in diarrhea teaching had taken place in nearly all the medical schools, with teachers using the *Readings* as a source of teaching material and employing more participative teaching methods such as discussions, exercises, and more effectively supervised clinical practice.

Problem areas included a variable supply of patients according to season. With large numbers of students in learning groups, a student may in certain seasons have only a single patient for practice. Also, provision of food in diarrhea training units was difficult.[4]

The investment by WHO in this activity was limited to supporting the workshops, providing the learning materials for each medical school, and providing a minimal set of equipment (projectors and a video machine) for a total of approximately $2500 per school. In addition, WHO supported two experienced consultants to provide leadership during the workshops.

The Nigerian and Indian experiences have confirmed that the workshop approach is very positively received. It remains to be seen what the impact will be on actual changes in diarrhea teaching in the participating medical schools in those countries.

It may be concluded, however, that feedback and evaluation from both the earlier and the current pilot trials indicates that the current approach is effective in changing teaching. In Indonesia and the Philippines, as well as Vietnam, the changes have been substantial. Improvements in the care of patients in the teaching hospitals and thereby the role models presented to students have taken place, as well as improvements in the teaching methods being used by the faculty. These improvements provide hope for the future, and justify future donor investments in improving medical education.

What remains to be demonstrated is whether providing medical students with this improved educational experience will in fact affect their future diarrhea case management. In none of the countries so far involved in these pilot efforts has there been a well-designed research activity to examine the impact of this teaching approach. Given the multiple influences that affect treatment practices by physicians, one may still question whether a better medical school experience will substantially influence those practices. Perhaps an appropriate basic educational foundation will subsequently facilitate adoption of appropriate treatment methods in the future, although not guarantee them. Thus, if a national government or private program to promote ORS takes place, such well-prepared physicians might be more likely to respond appropriately. This theory too needs testing.

The new teaching methods for diarrhea might improve medical education methods more broadly as well. In Indonesia, the diarrhea teaching improvement has been the catalyst for changes in other aspects of pediatric medical education. At Gadjah Mada University, the improvements in diarrhea teaching incorporated approaches such as communication with families using one-way mirrors and videos for students to improve their communication skills, innovative community health center and village-based interactions, substantial

[4]World Health Organization Control of Diarrhoeal Disease Programme unpublished report, 1993.

increase in the hands-on experiential learning, and the like. These teaching methods have now been applied to other diseases and have spread beyond pediatrics to other academic departments as well. In the Philippines, some pediatric leaders are actively discussing how to apply these methods to other topics; the same is happening in Vietnam.

In other Indonesian and Philippine medical schools, less application of the new teaching methods to other topics and departments has taken place. In many cases the pediatricians involved with the diarrhea workshops kept the experience and new methodologies to themselves. The innovations in diarrhea teaching were seen as just another technical aspect of diarrhea, rather than as a starting point for a larger revolution in medical education at the school.

Thus, it appears that the potential for broader change in medical education following from efforts to improve diarrhea teaching is real. Explicit efforts or special conditions are likely to be needed, however, if this is to occur.

Preservice Nursing Education

Worldwide efforts to improve nursing education related to diarrhea have been substantially fewer than those involving medical education. Yet nurses in many parts of the world work at the community level and are frequently in charge of managing health centers and supervising other health workers. In many countries, nurses provide direct patient care including diagnosis and treatment of diarrhea patients. In Africa, nurses involved with maternal infant centers play a critical role in prevention of diarrhea as well as in education of mothers to handle diarrhea episodes at home. This fact led PRITECH and WHO to launch an effort to influence nursing education as well.

Beginning in 1986, the PRITECH/Sahel Office and WHO collaborated in a project to improve the diarrhea-related curriculum at schools of nursing in the Sahel region of Africa. Schools took part in the development of a set of competency-based modules aimed at intermediate-level workers, that is, those between the physician and the community level. These modules provided detailed descriptions of activities and exercises for nursing students both in the classroom and during practicums in the field.

The sequence of activities in the project was doubtless important in its eventual impact on education. The modules were prepared with substantial participation of the teachers, including an early workshop in which two representatives from each school reviewed and suggested changes to the first draft of the modules prepared by PRITECH and WHO. Following finalization of the modules, the next step was working out individually with each of the 11 schools how to integrate the materials into their specific curriculum. PRITECH provided ongoing encouragement, support, visits and phone call consultation to help in these implementation efforts. Subsequently the PRITECH workers in the Sahel region followed up in each school during visits to the CDD programs in involved countries.

Although a formal evaluation has not taken place, various sources of information, including some health facility surveys involving graduates, indicate that the modules have made a positive impact on nurse training in the Sahel. More time has been allocated to CDD, the modules themselves have been praised in both form and content, and perhaps most importantly, the existence and implementation of the modules has facilitated interaction between national CDD programs and the nursing schools. Such interaction had been absent prior to the initiation of this project.[5]

Nursing Curriculum Components (Sahel Project)

Module 1. Epidemiological overview and clinical concepts
Module 2. Treatment and prevention of diarrheal disease
Module 3. Appendix (cholera)
Module 4. Application of health education techniques to diarrheal disease control programs
Module 5. Elements of a national program to combat diarrheal diseases
Module 6. Field training workbook and teacher's guide

The modules have generated considerable interest from countries outside the region and at other schools in the region. They are currently being used in 16 of the 21 schools in the six Sahel countries in which PRITECH works, and have been translated into Arabic and English from the original French version.

Some of the issues and problems described by the nursing effort are similar to those in the medical education improvement effort. It is hard for the faculty to dedicate enough student time to complete the modules: as in medical education, nursing schools at times seem to give priority to covering many topics superficially rather than choosing more important topics and ensuring depth of skill and understanding in those more limited areas. The ability of nursing school teachers to teach is limited, and the types of participatory teaching that bring about good skill learning are not part of the methodological repertoire of many of the teachers. The teachers themselves are unfamiliar with good diarrhea management and control practices, and case management is poor in many of the health facilities where students do their urban and rural practicums.

In such sites, it is not always feasible for nursing faculty to influence successfully the treatment practices of the doctors who control case management techniques in those facilities. In addition, student practicums often involve the provision of extra hands rather than specifically targeted learning activities. Some such practicums may have learning objectives, but these are rarely translated systematically into specific learning activities. The

[5]Suzanne Prysor-Jones, "Integrating Diarrhea Control Training into Nursing School Curricula in the Sahel," *PRITECH occasional paper,* Arlington, VA, Management Sciences for Health PRITECH Project, August 1992; World Health Organization, "Experience with the Use of CDD Modules in Nurse Training Schools in the Sahel," in *Programme for Control of Diarrhoeal Diseases Eighth Programme Report, 1990-1991,* Geneva, World Health Organization, WHO/CDD/92.38, p. 15.

field training workbook, with its concrete learning activities laid out in detail, is thus a big departure from the usual practicum methodology.[6]

Given these problems, substantial technical and motivational support was clearly a key factor in the successful implementation of the new program. This support included both support from the national CDD program, and long-term recurrent support by the PRITECH local representatives and regional technical staff directly to the nursing school teachers and leaders.

An additional aspect of great importance has been the provision of enough sets of training materials for all of the students as well as the teachers. In these countries, the availability of books and learning materials, particularly workbooks, is extremely limited. In many developing countries, textbooks are not readily available even for physicians, and students depend on faculty lectures to provide the information for their education. Thus, a major contribution to improving the educational process can be provision of learning materials for students as well as teachers. Such provision also frees the faculty to spend more time on providing leadership in skill building activities, rather than on transfering information.

The Sahel experience showed in particular how important long-term follow-up is to producing change. The recurrent visits to each of the participating schools and help in problem solving have been critical to bringing about change. What may be noted is that full-time on site advisors at the schools were not necessary. The effort has moved ahead effectively with only occasional outside inputs but based on a clearly defined long-term plan and objectives. The supportive involvement of interested outsiders encouraged the changes to be institutionalized.[7]

ISSUES AND ALTERNATIVES

The experiences described above have illustrated some of the factors which are important in bringing about change in medical and nursing education related to diarrheal disease control. At the same time, the experience has identified issues and choices which need to be dealt with in order to move forward. This section proceeds from macro-level strategic issues to more operational concerns at the micro level within the medical school and teaching program itself.

CDD medical education in an integrated context. As child survival moves away from dedicated CDD programs toward integrated programs (such as the sick child or primary health care) should efforts to improve specific CDD medical education be continued? On the affirmative side, the amount of work already invested in the newly completed and

[6]Prysor-Jones, "Integrating Diarrhea Control Training."

[7]Prysor-Jones, "Integrating Diarrhea Control Training."

already proven medical education package from WHO/CDD would strongly favor its implementation. A similar package at the level of detail needed for the whole range of integrated sick child and preventive health care would be equally long in production, perhaps five or six years. Also, experience with medical education has indicated that a focused package can enable teachers to acquire new teaching skills that can then be applied to other topics.

An appropriate compromise would be to add modules representing integration to the current CDD medical education package. A module on growth monitoring and nutritional assessment of the child was developed for the original PRITECH/WHO pilot materials, for example. Such a module would help to integrate assessment and management of malnutrition with diarrhea management. The current assessment module could be modified over time to include the broader skills needed for any sick child. This modification would be particularly appropriate, as many of the sickest diarrhea patients who are most likely to die, will have other illnesses needing accurate assessment and management at the same time as their diarrhea. Thus, going ahead with CDD-related development activities, but moving gradually toward a combined or more integrated effort, might be the most appropriate compromise.

The balance between medical education and in-service training in CDD programs. Up to the present the major, almost overwhelming, emphasis in CDD programs has been on in-service training, that is on efforts to change the behaviors of already practicing physicians and other practitioners. We have elucidated already the inertia and difficulties of changing medical education, which constitute arguments against choosing to increase investment in medical education. On the other hand, the investments in in-service training have not been nearly as successful as hoped. Even doctors trained in good training programs have in many cases not implemented their training upon return home, and many teaching programs have not used ideal training methods. Trained personnel have often been transferred after a few months to new positions, effectively erasing the impact of the training investments. Effective follow-up, meaning supervision and support by on-line management, has been meager or absent completely, further ensuring the failure to implement the training on return home. In addition, training has rarely been provided to persons not employed by the Ministry of Health, such as private practitioners. Given these discouraging results from in-service training, medical education in comparison rises in priority.

Professor behavior as a model for student behavior. Within many otherwise good programs, the professors themselves regress to inappropriate treatment practices in their private afternoon clinics. Even in hospitals with WHO-sponsored diarrhea training units, the treatment methods used between sponsored courses may revert to "the old way" of intravenous and drug therapy. Behavior discrepancies from what should be standard are not confined to underuse of ORT and overuse of drugs, although these are the most flagrant and obvious. They also involve such fundamental elements of practitioner behavior as failure to touch or examine the child, talking minimally if at all to the mother, and never mentioning prevention. Implementation of diarrhea training units, with effective quality

standards and supervision by national programs, has helped a great deal with this problem, particularly where younger DTU physicians ensure correct diarrhea case management practices. The key to longer-lasting improvement is to change the norm of clinical diarrhea management. This will involve changing the expectations of both practitioners and patients.

Hands-on experience with diarrhea patients. Direct personal experience in the miracle of ORT has been shown to influence strongly subsequent attitudes toward its use. In many medical schools, however, hands-on practical student experience with diarrhea patients may be minimal. Very large classes make direct student responsibility for patients difficult to arrange and manage for the faculty. Practical activity by its very nature involves more teacher time, and physicians on medical school faculties are typically burdened with clinical tasks that interfere with devoting additional time to teaching. This is particularly true of activities outside the hospital in community health centers or in the community itself. In addition, the number of patients presenting with severe dehydration has decreased overall in some locations, and during certain seasons is even lower. Modern technology can assist in part, through the provision of at least visual exposure to patients with dehydration by means of video.

In 1988, for instance, UNICEF produced a video in 23 modules showing dramatically the characteristics of pediatric patients presenting with varying degrees of dehydration and being successfully rehydrated with ORS. A shorter version of this video is available from WHO. While not a substitute for first-hand experience, such videos are substantially better than printed descriptions or still photographs in conveying the signs of dehydration and the methods used to rehydrate.

Upon which academic discipline should CDD medical education concentrate? Pediatrics in some countries is relegated to second-class status. In Pakistan, where pediatrics had not had its own final examination until recently, the time available for diarrhea teaching was a few hours, not the few days needed for the recommended WHO curriculum. In such circumstances, it may be inappropriate to expect investment in diarrhea (a pediatric problem) to affect the medical education process more broadly. Even within pediatrics itself, investment of effort may be wasted, due to student failure to participate on the wards.

In such circumstances, medicine is the powerful academic department; but the most challenging diarrhea patients are not being handled by medicine. Community health, social and preventive medicine, or social pediatrics are, even more than pediatrics, likely to have second-class status in the academic hierarchy. Only a minority of medical schools provide good practical experience in communities, and many such community activities consist primarily of doing surveys, rather than implementing community programs like CDD. Thus these departments or divisions within departments may also be ineffective as collaborators.

A final alternative might be the Associate Dean for Education within the medical school, or an Office of Medical Education. Such positions are often powerless, but in appropriate

hands (for example, the medical education specialist at Gadjah Mada University) collaboration may lead to substantial changes in teaching methods in diarrhea and other topics. Due to the rarity of such individuals, however, this is not a strategy that one can hope to apply broadly.

CDD as a community activity. The predominant strategy for CDD programs, that of case management, focuses on the individual patient and the reduction of mortality from better treatment of individual diarrhea episodes. Preventive program strategies are largely community- and population-oriented (measles immunization, promotion of breastfeeding, and handwashing). The current package of medical education materials similarly stresses case management in the individual patient. Efforts to improve community CDD teaching might lead to broader improvement of community teaching activities. Also, since departments of community health are often the departments responsible for managing student experiences in community health centers in rural hospitals, it may well be that such rural facilities could be upgraded to become effective diarrhea teaching sites, even diarrhea training units, in a manner similar to the model provided by the WHO training course in case management for use in small hospitals.[8]

Donor roles and inputs. Donor support of research carried out within medical schools by leading pediatricians or community health faculty has proven to be effective in attracting faculty attention to diarrhea and CDD. Such attention may lead to efforts aimed at better and more active teaching.

Donor support for a local representative to work on CDD including medical or nursing education has generally been cost effective, judging from the PRITECH experience with such local representatives. The ability to become personally acquainted with faculty and to pursue collaborative interventions in a variety of institutions and areas makes this model of donor input particularly effective.

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[8]World Health Organization Control of Diarrhoeal Diseases Programme, *Guidelines for Conducting Clinical Training Courses at Health Centres and Small Hospitals,* CDD/SER/90.2, Geneva, WHO, 1990.

SUMMARY AND RECOMMENDATIONS

If the progress and experience of the 1980s in medical education related to diarrheal disease control is built upon, the 1990s should provide opportunity for payoff from that investment. While the environment in which CDD medical education would take place has shifted toward a more integrated approach to child health, in this writer's opinion, focused attention to CDD medical education continues to be appropriate and useful.

Recommendations:

Donors to national CDD programs should devote an increased portion of their child health resources to medical education in diarrheal disease in the 1990s. The rationale for investment in medical education continues to be sound: providing the student with a foundation of correct experience will substantially facilitate later adoption of correct case management practices, while not guaranteeing them. The experience of the 1980s, with its successful investment in the development and piloting of CDD teaching materials in a range of country situations, has provided the tools and methodologies needed for successful projects. In particular, it has indicated that the level of investment needed is reasonable. In the context of an active national CDD program, investment in workshops and minimal basic equipment, accompanied by a small level of recurrent continued support, can lead to effective adoption of new programs in nursing or medical education. The payoff in improved teaching techniques has been shown to spill over into other pediatric teaching, and even into other academic disciplines in the medical schools.

Use the methods and materials developed in the 1980s. The newly finalized WHO materials in medical education have been tested, and represent an effective compromise in terms of content, activities, innovation, and active learning components. In nursing education, the same is true: the existing materials have been tested and contain appropriate CDD content and active, skill oriented educational methodology. Combining workshops with long-term continuing input such as PRITECH's nursing program in the Sahel and the medical education programs in both Indonesia and the Philippines, appears to be the most effective approach to introduction of the materials.

Provide integrated support to medical faculties if possible. Those medical schools that have been the most successful are those in which the faculty has not only become involved in changes in teaching, but has also begun research activities in CDD. Where other donor support (for example the Applied Diarrheal Diseases Research Project) has been available to support such research activities, the medical education efforts have been more successful, because of the increased commitment of the senior professors to the topic. Accordingly, various inputs in addition to medical education should be made available where possible, to encourage a broad range of activities all related to improvements in diarrheal disease management and teaching.

A particular element in this recommendation is the development of the diarrhea training unit. Fundamentally a clinical activity and facility, it represents the physical and operational base for good teaching. Support to medical schools should not focus exclusively on teaching activities, but must include attention to, and when necessary investment in, improvement in the facilities and methods used in diarrhea case management. This may involve a small investment in equipment, but perhaps a larger investment in clinical training, monitoring, and management support, as institutions establish treatment units and improved routine diarrhea treatment procedures.

Concentrate investment in pediatrics. From the point of view of long-term physician behavior, particularly with regard to the future careers of the majority of physician graduates, focusing most of the attention on pediatrics as the clinical specialty involved with pediatric diarrhea is more likely to provide success, in comparison to an investment in community health or basic science. For a variety of reasons, case management will continue to be the cornerstone for diarrheal disease control in the 1990s and beyond. While physicians will take leading positions in community health centers and national public health programs, the majority of medical school graduates will become clinicians, increasing the payoff from clinical investment.

In addition, community health teaching has not yet been moved ahead by equivalent investment from WHO or others in the development of special teaching materials, or even by development of a strategy to overcome the significant barriers existing in medical schools to improve community health teaching. Both faculty and students are reluctant to leave the hospital or campus, and the logistical challenge of managing widely distributed teaching activities and facilities has made it unusual in the developing world to see effective community-based teaching and service programs run by medical schools. In Indonesia, national policy has in essence given up on medical schools as a means of preparing manpower for public health/community service, and has developed a new network of schools of public health, following the model used in the United States. While one may question the wisdom of this approach from a broader perspective, relative to CDD it appears that investment in community health is substantially less likely to result in significant changes in teaching, in comparison to investment in clinical teaching in pediatrics.

Include long-term activities and follow-up in medical education development programs. The work overload experienced by most medical school faculty members means that continuing inputs are needed to ensure continued attention. Setting deadlines for reports, planning follow up workshops for participants, and providing on-site visits by local or external experts, can make a substantial difference in maintaining momentum in CDD medical or nursing education improvement. Donors should be prepared to provide the personnel and financial resources needed to ensure effective follow-up following introductory workshops and distribution of materials; lesser investment may have high rates of failure.

Develop additional teaching materials to show how to extend the innovative CDD teaching methods into integrated aspects of child health. The multiple health problems of those children most likely to die of diarrhea and the institutional shift toward more integrated activities, make highly desirable the planned incorporation of broader topics and activities into the CDD medical education package. The early PRITECH pilot CDD materials included a module on growth monitoring and nutritional status assessment, to detect malnutrition in a child with diarrhea and provide a basis for additional nutritional management. Broadening the assessment components of the CDD package to include assessment of the whole child, including recognizing chest indrawing or counting the breathing rate for pneumonia, for example, will help to ensure that all the problems present are being detected. It would be a significant improvement to bring the creativity and active learning focus of the WHO materials to a needed area. Investing in the development of a set of teaching materials for sick children may be inappropriate at this point, as so many other activities should take priority as programs move in that direction. However a limited modification to the WHO CDD medical education materials would not be too expensive and would substantially expand the usefulness of those excellent products. WHO CDD is already involved in developing training materials for teaching case management of the sick child to health workers. These could be adapted for use in medical or nursing schools.