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THE QUALITY ASSURANCE PROJECT: INTRODUCING QUALITY IMPROVEMENT TO PRIMARY HEALTH CARE IN LESS DEVELOPED COUNTRIES

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Persistently excessive morbidity and mortality rates in less developed countries (LDCs) served by primary health care systems suggest that the quality of services is inadequate. The PRICOR project, sponsored by the United States Agency for International Development, has designed and implemented methods for quality assessment and problem solving in LDC health systems. After developing comprehensive lists of essential activities and tasks, similar to practice parameters, for seven child survival interventions, PRICOR supported comprehensive quality assessment studies in twelve LDC countries. The studies, yielding over 6000 observations of health worker–client encounters, indicated highly prevalent, serious program deficiencies in areas including diagnosis, treatment, patient education and supervision. To facilitate corrective action, PRICOR assisted managers in conducting operations research to resolve priority problems revealed by the assessments. The recently initiated Quality Assurance Project is building on PRICOR techniques in designing and implementing sustainable continuous quality improvement programs for LDC health systems.

Key words: Primary health care, child survival, continuous quality improvement, quality of care, developing countries.

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INTRODUCTION

Each day an estimated 40 000 children in less developed countries (LDCs) die from the effects of infection and malnutrition. A number of simple, efficacious primary health care interventions have been implemented globally to prevent and treat the most prevalent illnesses. Despite significant resources which have been designated for supplies, logistics, training and management, the quality of services is generally believed to be inadequate. Until recently, however, both the degree and the nature of this inadequacy were a mystery. In their 1988 report for the World Health Organization, Roemer and Montoya-Aguilar state, "Relatively little work has been done on the evaluation of public health programmes in general and primary health care in particular. Even less has been done to assess the quality of primary health care in developing countries, and to consider how quality can be maintained"[1].

During the past 5 years, the PRICOR project, sponsored by the United States Agency for International Development (AID), has taken initial steps toward incorporating quality improvement measures into LDC primary health care systems. In this process, PRICOR has faced some unique challenges. Firstly, most child survival services are provided through large-scale delivery systems with non-physicians as the major service providers. These systems generally operate within the constraints of extremely restricted resources for essentials such as drugs, supplies and training of personnel. Further, the accuracy and completeness of record keeping are generally not adequate for record-based quality assurance methodologies. Obstacles to direct observation of health worker performance, on the other hand, are relatively minor. Despite its feasibility, detailed observation of the quality of services is still uncommon in LDC health care systems, and few tools and techniques have been developed to allow managers to measure service quality. PRICOR has undertaken one of the first large-scale efforts in assessing health worker performance and solving problems. The recently initiated Quality Assurance Project is building on these PRICOR methods in designing and implementing sustainable programs for continuous quality improvement in LDC primary health care systems.

METHODS

A major constraint to assessing primary health care in LDC settings is the lack of detailed information about the components of service delivery. The process of care is usually like a "black box"—critical to eventual outcomes but out of the view of those responsible for managing services. PRICOR has developed an approach to assessing health worker performance in order to shed light on what goes on inside the "black box". This approach, termed *systems analysis*, uses a systems framework to evaluate how service delivery and essential support activities are actually being carried out. While most evaluative studies are focused on resource inputs and program outputs, systems analysis is focused on process: how resources are transformed into services. By examining what health workers are doing and how they are doing it, systems analysis provides information necessary for the identification of specific service delivery problems or obstacles to the implementation of quality care.

PRICORS's first step in examining the process of primary care delivery was to

establish standards of care. Project staff and consultants used WHO guidelines [2–4] and expert consensus to develop a comprehensive list of essential activities and tasks, essentially practice parameters, for the effective delivery of seven child survival interventions: case management of acute respiratory infection, diarrhea, and malaria; immunization; growth monitoring and promotion; maternal health; and child spacing. The project's approach was explicitly reductionist, breaking complex activities into their component tasks. A central requirement of the list was that an indicator be defined for each task in quantifiable terms that allowed measurement of a change in performance. A similar list of standards was developed for seven support functions (training, supervision, information systems, logistics, community outreach, planning and financing) related to child survival services. The two lists were published together as the PRICOR Thesaurus [5].

In 12 LDC countries* PRICOR offered technical assistance to managers and investigators in the use of the Thesaurus for conducting comprehensive quality assessment studies, or systems analyses, for child survival interventions. Local decisionmakers selected PHC sub-systems for study, often targeting perceived health problem areas or high priority programs. They also defined the type of health workers to be assessed. Once these general issues were resolved, relevant sections of the PHC Thesaurus were consulted to select the specific tasks to be examined in the field.

Project staff collaborated with host country counterparts to select methods and design instruments for data collection. The Thesaurus offered suggestions for the most feasible and/or reliable source for each indicator. In each country the research team then selected a sample of health facilities, generally comprised of a fixed proportion of the best and the poorest performing centers. This strategy was based on the rationale that problems appearing in the most reputable facilities were likely to occur throughout the entire system, while examination of poorer centers identified the scope of problems needing to be addressed. Since the PRICOR systems analysis methodology is intended to be primarily a practical tool for managers as opposed to a research technique, emphasis was not placed on achieving statistically representative samples. (Researchers in one country study, however, experimented with lot quality assurance sampling [LQAS], a technique which allows statistical tests based on the binomial distribution to determine if a particular characteristic surpasses an established threshold [6].) Regions were selected according to a variety of factors: accessibility, interest of medical officers, representativeness, national policy or priorities, and program characteristics. One of the chief considerations was that the sampling strategy seem clearly non-biased to managers who would be expected to use the information as a basis for subsequent action.

The results of the systems analysis were generally presented to health officials during workshops at which managers selected problems for corrective action. For some problems, only administrative action was needed. For others, brief, inexpensive, highly focused operations research (OR) studies were undertaken further to understand the problem and/or test alternative solutions. PRICOR provided local managers with training, technical assistance and resources to carry out OR, a systematic problem solving technique characterized by problem analysis, solution

* Colombia, Costa Rica, Haiti, Indonesia, Niger, Pakistan (Regi and Punjab Province), Peru, Philippines, Senegal, Togo, Thailand and Zaire.

development and solution testing [7, 8]. PRICOR sponsored 110 different OR studies to devise and test solutions to the more complex problems revealed by the systems analyses.

Interventions Examined

Diarrhea case management

PRICOR conducted nine systems analyses of diarrhea case management in eight countries for a total of 938 observations of health worker performance. In the context of LDC primary health care, a principal component of diarrhea case management is oral rehydration therapy (ORT), a set of activities to repair and maintain hydration to avoid morbidity and mortality associated with dehydration. The following are the tasks involved in ORT: clinical assessment; classification of dehydration; preparation and administration of a pre-packaged oral rehydration solution (ORS) or homemade sugar and salt solution; and counselling mothers on home treatment of diarrhea.

Growth monitoring and promotion

PRICOR sponsored analyses of growth monitoring services in seven countries for a total of 1547 observations of health worker performance. In providing growth monitoring services, health workers weigh children, record weights, plot growth curves in terms of weight for age, interpret results and counsel mothers. Outreach activities include home visits and group nutrition education sessions.

Malaria case management

Assessments of five separate malaria treatment systems were conducted in four countries for a total of 1338 observations of health worker performance. Specific targets of assessment and data collection methods varied according to the structure of the health system. (In Africa, where malaria is stable and endemic and health infrastructures are less developed, assessments focused on presumptive treatment with chloroquine based on clinical assessment. In Asia, where chloroquine-resistant malaria is more common and health facilities are more sophisticated, laboratory confirmation is a component of malaria treatment.) Health worker tasks associated with malaria treatment are the following: physical exam and history taking, diagnosis, treatment, counselling and health education.

Immunization

PRICOR assessed immunization activities in nine countries, all of which adhere to the guidelines of the Expanded Program on Immunization (EPI), a World Health Organization program aimed at reducing morbidity and mortality associated with diphtheria, pertussis, tetanus, measles, poliomyelitis and tuberculosis. WHO recommends a standard vaccination schedule to assure protection of children before they reach age one. The EPI service delivery studies, netting 3618 observations of immunization encounters, involved assessment of health worker performance as they identified and channeled children into the system: registered children; prepared and administered vaccines; disposed of needles and syringes; counseled caregivers about possible side effects; and explained when to return.

Case management of acute respiratory infection

Treatment of acute respiratory infection (ARI) consists of five major tasks: medical history, physical exam, classification, treatment, and counseling of the caregivers on home treatment. The PRICOR systems analyses of ARI case management, conducted in four countries and netting 588 observations of health worker performance, were focused on identification and treatment of presumptive pneumonia.

Supervision

While a number of functions are attributed to supervisors, their chief role with respect to quality of care is in *problem solving*. PRICOR described problem solving in terms of discrete, concrete activities related to their capacity to identify workers' performance deficiencies and take corrective action. The performance of supervisors was observed in four countries, totalling 678 supervisory encounters.

Data Collection Methods

The primary method for collecting data was observation of health worker performance. In some instances where no cases of a particular illness presented at the time of the study, mothers were asked to role play. Health workers were interviewed to gather data on knowledge, attitudes and practices concerning illnesses and treatments. Supervision was assessed through observation of supervisory visits and interviews with supervisors and health workers. Exit interviews were conducted to assess caretakers' knowledge following treatment and counseling, and household interviews were conducted to investigate health-related knowledge and behavior. Other services besides supervision which support the delivery of care, such as training and logistics, were reviewed through observation, record review and interviews with health workers and supervisors.

RESULTS

Assessment

Below are summaries of systems analysis data which characterize the quality of service delivery for five child survival interventions. Data from studies on the quality of supervision are also presented.

Diarrhea case management [9]

The most favorable finding revealed by the systems analyses on diarrhea case management is the widespread reliance on ORT. Systems analyses in seven countries showed that clinic-based workers prescribed ORT in 80–96% of cases; studies in three other countries indicated that village-based workers prescribed ORT in 76–100% of cases.

Less encouraging were data concerning the percentage of health workers who carried out all recommended tasks for history taking and physical exam. These two clinical assessment activities are essential steps in ORT since they furnish information required for classifying the state of dehydration and making decisions about

treatment. Table 1 presents the findings on health workers performance of clinical assessment tasks.

A number of problems related to treatment were also revealed:

- the percentage of health workers who actually administer ORS at the time of treatment was only 25% in the best case, and nearly negligible in several other countries;
- many health workers automatically prescribe antibiotics with ORT; in two countries, the proportions were as high as 78% and 88% of health workers surveyed;
- in Niger, 69% of mothers surveyed ($N = 378$) said that health workers prescribed charcoal as an anti-diarrheal and Ganidan as an antibiotic.

Studies in 10 different sites indicated that counseling associated with ORT is inadequate. Table 2 shows the percentages of health workers who provide caretakers with essential counseling messages and who use various education methods. Also presented are the percentages of cases where the recipe for ORS or sugar/salt solution was correct.

Growth monitoring and promotion [10]

Growth monitoring is worthwhile only if it improves parental knowledge of children's nutritional status and helps to improve family feeding practices. The systems analyses revealed widespread deficiencies in the counseling and education that health workers offered caregivers at the time of growth monitoring. Frequently, parents were not told how the child's weight was progressing, and they were not adequately informed of problems. In Zaire, the mothers of children whose weight-for-age fell below the 80th percentile were no more likely to be told of the child's nutritional status than those whose children fell above 80%. In most cases health workers did not offer appropriate advice on feeding, either by discussing the diet in the home or be referring the child for supplemental feeding when warranted. Figure 1 offers a summary of the data from five countries concerning counseling. The graph shows that the majority of health workers surveyed failed to communicate to caretakers standard information at the time of the weighing encounter.

The systems analyses showed that weakness in counseling is reflected in mothers' lack of knowledge concerning issues related to growth monitoring and nutrition. Interviewed at home, many mothers did not know the purpose of growth monitoring and could not locate their child's card. Only 22% of those interviewed in Haiti, 30% in Thailand, and 58% in Zaire could either explain the use of the growth card or identify detection of malnutrition as a major reason for using it. (In Colombia, though, 94% could do so.)

Tailoring advice to the nutritional status of the child first requires accurate weighing, age calculation and plotting of the growth curve. Analysts found that health workers generally did perform those standard tasks better than they did counseling. Analyses in four countries indicated that at least 80% of health workers surveyed assured the child was properly placed on the scale, and read and recorded the weight correctly. Nevertheless, a significant problem encountered in several countries is that seemingly minor inaccuracies in weighing and recording easily cumulate into much larger total error rates. In the Philippines, for example, weights were read correctly 81% of the time and then properly recorded in 85% of cases; the likelihood of correct performance of both steps was, thus, only 69% (0.81×0.85).

TABLE 1. ORT service delivery: observation of health workers carrying out clinical assessment tasks (percentage of patient–health worker encounters in which task was performed)

	Community-based workers			Clinic-based workers						
Country	Niger*	Senegal*	Thailand*	Regi	Punjab	Peru*	Philippines	Senegal*	Thailand*	Zaire
No. of observations	134	103	35	27	168	79	105	29	14	38
Asking history question										
Duration of diarrhea	41	68	–	96	90	76	82	100	–	97
Frequency	8	24	37	100	83	90	64	69	37	97
Blood/mucus	6	24	6	93	52	60	26	59	6	66
Vomiting	7	22	17	85	43	20	10	59	17	71
Fever	11	–	20	70	52	--	23	–	20	76
Decrease in urine	0	–	0	7	4	10	2	–	0	11
Thirst	0	–	–	19	24	16	1	–	–	40
Treatment at home	5	–	–	7	15	22	38	–	–	47
Doing physicel examination										
Assess alertness	–	–	0	–	–.	–	–	–	11	–
Examine mouth	2	14	9	41	22	76	4	59	36	71
Pinch skin	8	27	8	19	20	82	10	83	36	90
Examine eyes	2	21	9	–	17	84	–	66	43	82
Touch fontanelle	2	6	–	7	8	72	9	45	–	74
Feel pulse	0	–	–	–	49	10	–	–	–	–
Weigh child	–	1	–	4	–	35	23	41	–	71
Take temperature	–	–	3	41	21	25	31	–	50	71
Classifying dehydration	4	3	3	–	–	90	–	48	43	13

– Data not available.

*Some diarrhea treatments were simulation/role-plays: Niger (12%); Senegal (CHW 34%, Nurses 28%); Peru (100%); Thailand (% unknown).

TABLE 2. ORT service delivery: observation of health workers counseling mothers (percentage of patient–health worker encounters in which message was communicated)

	Community-based workers			Clinic-based workers						
Country	Niger	Senegal	Thailand	Regi	Punjab	Peru	Philippines	Senegal	Thailand	Zaire
No. of observations	134	103	35	27	168	79	105	39	14	38
Counseling messages										
Preparation ORT	75	74	100	93	41	92	80	86	92	32
Administration ORT	23	18	92	56	16	88	—	55	75	—
How ORT works	14	0	—	—	—	22	—	—	—	—
Extra fluid/breast	1	19	—	—	17	76	—	57	—	—
Feeding during/after	2	9	60	52	42	55	45	38	43	17
Dehydration signs	1	17	—	7	2	19	—	38	—	—
Circumstances under which to return	19	17	89	15	29	40	—	72	86	44
Correct recipe given										
ORS*	53	36	—	—	—	—	—	80	—	—
SSS*	40	28	—	—	—	—	—	65	—	91
Counseling methods										
Demonstration	—	—	—	—	7	32	—	—	—	—
Have mother repeat	17	14	—	4	2	16	—	45	20	—
Invite questions	—	—	—	4	6	—	—	—	—	—

— Data not available.

*This is taken as a percentage of cases where instructions were given.

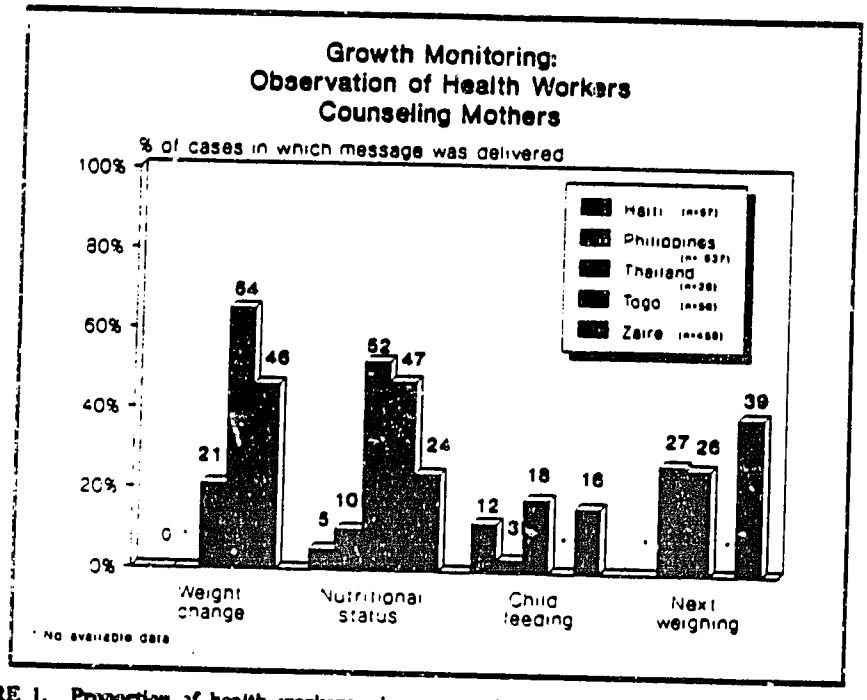

FIGURE 1. Proportion of health workers who communicate to mothers essential health education messages in growth monitoring sessions.

Furthermore, in some countries certain mechanical or procedural errors were quite prevalent. In Zaire only 25% of the children were fully undressed according to standard procedure for weighing. In the Philippines, only 35% were fully undressed, and in 66% of cases the scales in use were bathroom scales, leading to imprecision in weighing. Inaccuracies in plotting growth curves were found in certain countries; in Thailand, for example, mistakes were found in 45% of cases observed.

Malaria case management [11]

Clinical assessment involves history-taking and physical exam (and in some countries laboratory confirmation) to reach a diagnosis of malaria. Table 3 indicates that in most cases health workers were omitting many essential tasks of clinical assessment, thereby reducing the confidence by which they could rule out other causes of fever.

The studies also revealed deficiencies in actual treatment. Five studies revealed that health workers prescribed correct dosages in only 41–60% of cases. In two additional countries, some health workers followed a treatment protocol that deviated from Ministry of Health policy.

Health workers frequently failed to counsel caregivers on safe care of the patient in the home and proper use of chloroquine. Data from five studies show that health workers explained how to take the prescribed chloroquine in 11–76% of encounters; they explained the importance of completing treatment in 5–53% of encounters; and they explained the circumstances which warranted a return to the clinic in 5–52% of cases.

TABLE 3. Malaria service delivery: clinical assessment (percentage of patient–health worker encounters in which task was performed)

Country	Niger*	Senegal*	Senegal*	Zaire	Punjab	Punjab	Regi
Type of workers	CHW	CHW	Clinic	Clinic	CHW	Clinic	Clinic
No. of observations	81	105	25	57	150	194	24
Asking history questions							
Duration of fever	—	79	100	—	31	96	50
Fever pattern	16	37	64	—	10	59	21
Chills/sweats	2	—	—	16	21	52	54
Headache	14	—	—	2	—	25	—
Vomiting	10	—	—	79	—	37	—
Convulsions	1	—	—	18	—	4	—
Cough	4	—	—	61	—	50	—
Diarrhea	14	—	—	63	—	21	—
Sore throat/nose	2	—	—	43	—	21	—
Ear pain	1	—	—	18	—	5	—
Joint pain	1	—	—	0	—	7	—
Urinary complaints	0	—	—	—	1	18	9
Treatment at home	4	11	33	40	-	5	-
Doing physical examination							
Assess temperature	31	59	92	90	0	53	46
Examine for stiff neck	2	—	—	55	—	6	—
Palpate abdomen	6	—	—	82	—	18	—
Auscultate lungs	—	—	—	70	0	54	33
Examine ENT†	2	—	—	72	1	31	29
Examine skin	—	—	—	54	—	7	—
Take blood slide	—	—	—	—	87	31	50

— Data not available.

*Some treatments were simulation/role-plays: Niger (12%); Senegal (CHW 37%, Nurses 12%).

†This includes any of the following: ear, nose or throat.

Case management of acute respiratory infection [12]

Clinical assessment was studied in three systems analyses through observation of health worker performance. While health workers routinely performed some type of general clinical assessment, they often neglected ARI-specific clinical assessment tasks. For example, in the Philippines health workers asked about cough in 85% of cases, but they counted respirations in only 16% of cases and checked for cyanosis in only 1% of cases.

Health workers also need improvement in the area of classification of illness by severity. Again in the Philippines, observation showed that only 23% of health workers properly classified the severity of the illness, and treatment was correct in only 31% of cases. In Indonesia, record review showed correct classification of illness in 65% of cases; treatment was correct in 30% of cases. Appropriateness of treatment administered by community-based workers in Indonesia was mixed: while 80% of workers refrained from giving antibiotics for mild cases of ARI, only 48% correctly administered antibiotics in the case of pneumonia. Based on interviews, clinic-based workers in Colombia correctly classified ARI in 35% of cases and gave correct treatment in 74% of cases.

Weaknesses found in the counseling were reflected in mothers' lack of knowledge about when to seek care. In Indonesia, for example, mothers were asked to react to the statement "an infection in the lung/trouble breathing in a small child probably isn't very serious". Of mothers surveyed, 26% agreed with the statement, 35% disagreed and 39% did not know. In exit interviews in Pakistan, mothers were asked what danger signs would alert them to seek medical attention. Of 73 respondents, 60% were unable to name one danger sign.

Immunization [13]

In nine separate studies direct observation was made of immunization service delivery. Health workers generally examined children's vaccination records before administering vaccines. Furthermore, in all but one case, use of sterile needles was generally high. One significant exception was the case of Zaire, where *unsterile* needles were used in a third of cases. The data on the use of sterile syringes pose a contrast to the findings on the sterility of needles. In three countries, sterile syringes were used in less than 50% of cases. Table 4 shows the proportion of vaccination encounters in which the health workers checked the child's vaccination card and used a sterile needle and a sterile syringe.

Technical application of vaccines, including angle of the needle and site of the injection, was generally correct in all studies except for one. In Thailand, investigations showed that health workers demonstrated correct technique in administering BCG in 92% of cases, DP in 100% of cases and measles vaccine in 91% of cases. The study of vaccination techniques during the national vaccination campaign in Peru showed 90% correct for DPT, 84% for measles and 95% for oral polio vaccine. A second study in Peru, which included observation of clinical service delivery, showed correct vaccination for 90% of DPT, 80% for measles and 95% for oral polio vaccine. A study in Costa Rica, on the other hand, showed that 14 out of 18 health workers introduced the measles vaccine incorrectly.

Eight studies examined what messages health workers communicated to caregivers. As indicated in Table 5, performance in health education varied widely among different countries.

TABLE 4. Immunization service delivery: observations of vaccination encounters (percentage of cases in which task was performed)

Country (cases)	Examine vaccination card	Use sterile needle	Use sterile syringe
Costa Rica (108)†	61	100	44
Punjab clinic (Pakistan 77)	80	81	•
Punjab outreach (Pakistan 853)	70	88	•
Haiti (87)	99	100	•
Regi (Pakistan 193)	55	•	98
Philippines (1013)	70	94	•
Thailand (60)	91	91	29
Senegal (330)	99	94	69
Zaire (405)	98	67	12

*No data available.

†Data collected through LQAS.

TABLE 5. Immunization service delivery: observation of health workers counseling mothers (percentage of cases in which message was communicated)

Country No. of observations	Costa Rica 108	Peru I 206	Peru II 168*	Regi (Pakistan) 193†	Philippines 1013	Senegal 330
Counseling messages						
Disease prevented	17	65	60	‡	51	‡
Vaccination schedule	22	50	60	‡	29	‡
Need to complete series	‡	‡	‡	67	40	‡
Which vaccine given	‡	80	96	‡	‡	‡
Possible side effects	17	‡	‡	‡	47	31
Possible fever	‡	75	62	30	‡	‡
When to return	‡	82	96	100	68	50

*Includes direct observation and role play.
†Includes clinic-based and community-based workers.
‡No available data.

Supervision [14]

A chief problem in supervision discovered by the PRICOR systems analyses was the discrepancy between supervisors' perception of quality of care and actual health worker performance. When asked what percentage of health workers they believed were carrying out tasks correctly, supervisors frequently overestimated the quality of performance. Figure 2 illustrates this gap as it existed in diarrhea case management activities performed by village-based workers in Senegal. Figure 3 illustrates the same problem in ARI treatment in the Philippines.

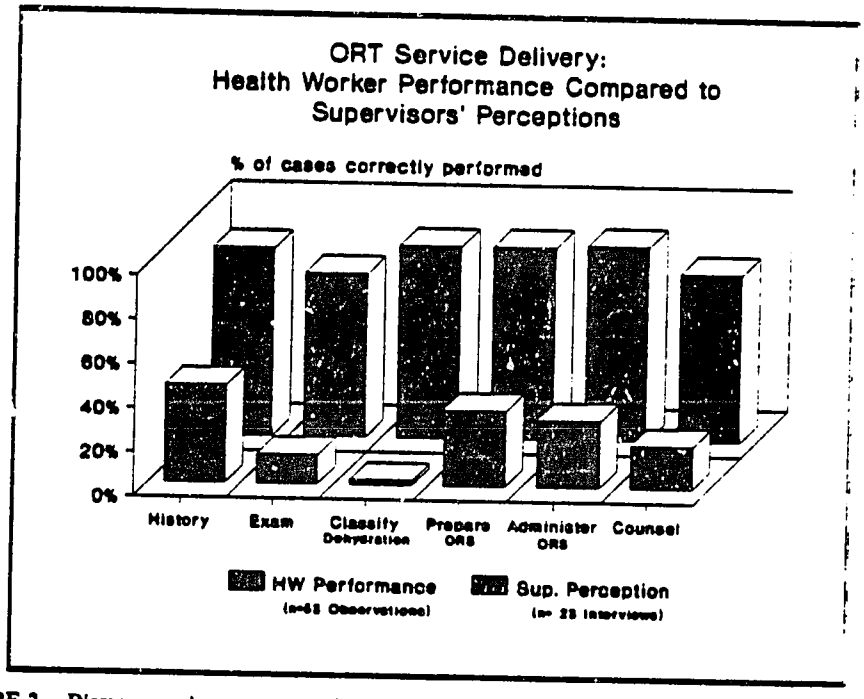

FIGURE 2. Discrepancy between supervisors' perceptions of quality of care and actual health worker performance in diarrhea case management.

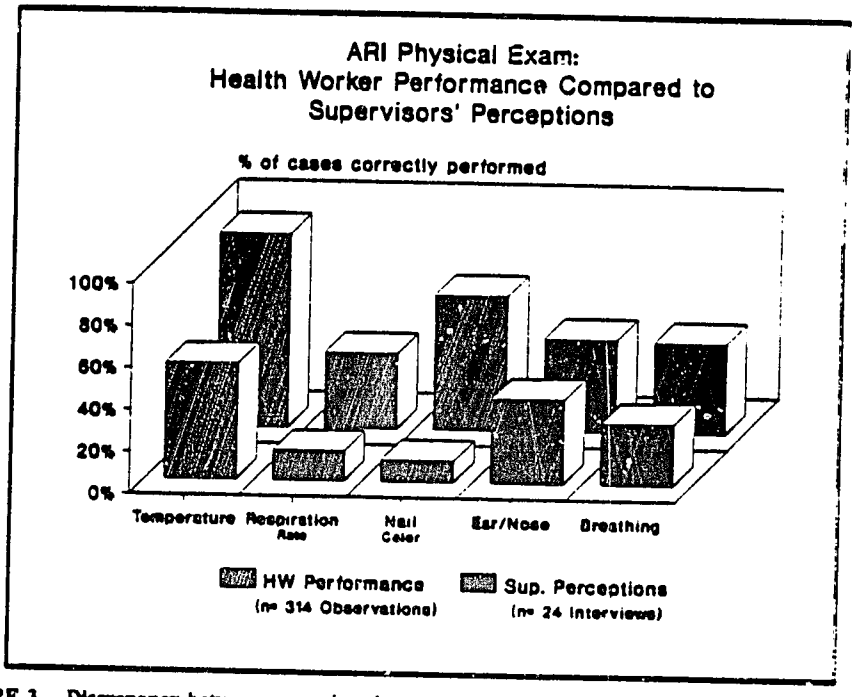

FIGURE 3. Discrepancy between supervisors' perceptions of quality of care and actual health worker performance in case management of acute respiratory infection.

One explanation for this poor understanding of service quality is simple lack of contact between supervisor and health worker. In many cases, supervision visits were found to be infrequent.

- In Niger, nurses are supposed to visit village health workers once every three months. Interviews with the nurses revealed that 18 of the 27 nurses had made only one round in the previous 6 months; two had not made any visits. The reason most frequently (52%) given for failure to follow the schedule was lack of transportation. Of 179 village health workers surveyed, they received an average of 1.2 supervisory visits per year.
- In Senegal, the systems analysis revealed that two-thirds of 92 supervisors interviewed had cancelled planned supervision visits within the previous 6 months. Lack of transportation was the most frequently given reason, although the analysis also revealed that functioning vehicles generally did exist at all levels of the supervisory system.
- In Pakistan, of the 18 supervisor/supervisee pairs interviewed, only 3 supervisees reported having regular meetings with the supervisors. Reported intervals between meetings range from 2–4 weeks to 6 months; in several cases, the elapsed time was too long for easy recollection.
- In Peru, 25% of health workers working in the same facility as the supervisor said they received little supervision; 35% said none at all. Moreover, 25% of health workers surveyed in Peru were unable to name their immediate supervisor.
- In Zaire, only 21% of 57 village health workers reported receiving a supervisory visit within the previous 3 months.

Even when supervisory visits were conducted, they were not necessarily devoted

to improving service quality. In most countries and for most primary care interventions, observation of health worker performance was not found to be a routine activity during supervisory visits.

- Of 27 supervisors in Niger who were asked how frequently they observe health workers treating patients, 15 (56%) responded "never"; 74% said they never observed health education sessions. When 173 village health workers in Niger were asked what supervisors do during visits, 85% responded "inspect the registers"; 88% responded "inspect the medical kit," and 2% responded "observe treatment".
- In the Philippines, of 73 supervisory visits involving ARI treatment, the supervisor observed the health worker/client encounter in 26 cases. During supervisory visits of growth monitoring, 28 of 50 supervisors watched health workers perform at least one task. Among 33 cases of diarrhea case management, the supervisor watched the health worker taking a history in 8 cases; the physical examination was observed in 3 cases.
- In Pakistan, 10 supervisors, representing 3 different national health care programs (Primary Health Care, immunization and malaria control) were asked what they usually examine when they make a supervisory visit. Their responses were staff attendance, supplies/drugs, equipment, maintenance of the cold chain, and registers. No mention was made of health worker performance. Interviews with supervisees confirmed this response.

Most supervisors do not receive training in supervision. As a result, supervisors do not have a clear understanding of the purpose or objectives of supervision and do not have well-developed skills in observing health worker performance to assess quality of care, in identifying and solving problems, in giving feedback, or in planning and managing supervision activities. For example, of 22 supervisors interviewed for a study in Senegal, only 2 had received any training in supervision, 3 in management and 3 in health planning. In Niger, only 5 of 27 supervisors interviewed said they had been trained in supervision.

Problem Solving

Below are examples of operations research studies which were conducted to further investigate problems identified by the systems analyses and to devise and test solutions.

Diarrhea case management

The PRICOR systems analysis in Zaire showed that although 90% of mothers knew the importance of administering sugar/salt solution (SSS) for diarrhea, less than 50% knew the correct recipe for SSS or the proper amount to administer. A zone medical officer carried out an OR study to correct this problem. He conducted a pre-test to assess knowledge, attitudes and practices among 50 mothers and 5 nurses by means of interviews, a questionnaire, and record review. Based on the findings, an intervention was introduced, comprised of a 7-day training course for nurses in ORT and health education techniques; an improved supervision strategy, which included the use of a checklist and more frequent visits; and an improved health education message which was posted widely. After 2 months a post-test was conducted using the same sample as the pre-test. Results showed the proportion of

nurses knowing proper treatment schedule and dose of ORS rose 80%. In only 20% of cases were other medications prescribed with ORS, as opposed to 90% in the pre-test. The proportion of mothers who were familiar with ORT rose 44%; who knew the recipe rose 20%; and who knew the correct dosage rose 28%.

Growth monitoring

The systems analysis in Togo revealed that mothers do not put into practice in their homes what they learned at growth monitoring sessions. Supervisors from a nutrition program piloted the recruitment of respected mothers from among the regular attendees to conduct home visits to other mothers to reinforce health education messages. Four mothers, selected to serve as "mother visitors," received training in basic nutrition and diarrhea treatment and were charged with conducting home visits. Health center personnel also conducted home visits to a group of mothers who served as the control group. Each mother in the experimental and control groups received visits once per month for 3 months. Through post-intervention interviews, the supervisors conducting this study found that with respect to ability to recall messages delivered at growth monitoring sessions, there was no important difference between the group of mothers visited by health personnel and those visited by their peers. There were slightly higher proportions of mothers remembering the "weaning foods" and "diarrhea" messages in the experimental group of the "Mother Visitors" than in the control group. The supervisors concluded that mothers serving as home visitors were an effective means of bolstering outreach efforts in nutrition education.

Malaria case management

Following the systems analysis in the Regi Model Health Unit in Pakistan, which found clinical assessment and patient counselling to be particularly weak, the provincial health secretariat designed two memory aids to help workers follow standard treatment protocols. The first was a series of task lists for each intervention, including malaria treatment. This was placed under Plexiglass on the practitioners' desks for ready reference. The second job aid was an outpatient slip, drafted to include spaces to record key tasks in a patient–provider encounter. A rapid follow-up survey consisting of interviews with 153 patients was conducted 30 days after the introduction of these job aids. The results were encouraging: of 42 tasks examined, 18 showed improved scores for correct performance in comparison to the systems analysis data. Considerable improvement was seen in clinical assessment procedures, particularly for malaria and ORT services.

Case management of acute respiratory infection

In Indonesia, the Ministry of Health (MOH) has used information provided by the systems analysis on acute respiratory infections to make several policy revisions. Among the numerous problems revealed by the systems analysis in ARI treatment, health workers at the puskesmas (peripheral) level used antibiotics for even very mild cases of ARI. In response to this finding, the MOH has changed certain ARI treatment/diagnosis protocols. One such policy change has been to make respiratory rate of >50 the basis for deciding whether to use an antibiotic. An operations research study was initiated to develop and test a simple, inexpensive strategy for reducing inappropriate use of antibiotics in ARI case management at the puskesmas level: sending a Letter of Order from the Provincial Health Officer reminding health

staff of the policy to reserve antibiotics for moderate and severe ARI cases. Prior to this intervention, 55% of ARI cases classified as mild were treated with antibiotics. After the Letter of Order, this percentage dropped to 26%. A rough cost analysis estimated that even for the 600 ARI cases examined in the study, $1200 in antibiotic costs alone were saved.

Immunization

In 1987 vaccination coverage in one zone of Zaire was less then 39%. To uncover the factors affecting coverage, a team led by the zone medical officer conducted a survey with 100 households in 4 health areas, during which pre-school cards were checked and mothers' knowledge, attitudes, and practices concerning immunization were assessed. Using the data, a solution strategy was developed: (1) promote vaccination at every opportunity, i.e. immunize every child who appears in the two hospitals of the zone; (2) train nurses using the national immunization training module; (3) conduct informal sessions discussing weak coverage rates for the health committees; and (4) intensify supervision of health workers in service delivery and development committees in community organization. Surveys of vaccination coverage were conducted with samples of 100 children in 4 health areas both before and 6 months after the intervention. Rates of vaccination completion among children 12–23 months rose from 66% to 84%.

Supervision

In Zaire, the systems analysis showed that despite numerous trainings, supervisory visits usually amount to nothing more than a review of records and participation by the supervisor in medical consultations. In one zone, a study team set as an objective to improve supervision by encouraging direct observation of health workers carrying out their tasks, followed by feedback. Baseline data were collected on service delivery and supervisory skills. Then supervisors and nurses met to collaborate on the formulation of supervisory checklists for specific tasks (vaccinations, treatment of diarrhea and fever, etc.), which were reviewed by national authorities. The supervisors paid monthly, pre-scheduled supervisory visits to the same health centers used in the pre-test. The checklist was employed and feedback was offered. A comparison of the performance of supervisors showed an improvement in their skills and approach to supervision. Performance of tasks by the health workers also improved over the course of the 6 months: aggregated data from the four health facilities showed that correct technique for vaccination rose from 50% to 85%; proper treatment of malaria increased from 46% to 87%; correct performance of tasks involved in ORT rose from 22% to 79% and in growth monitoring from 22% to 76%. The study team concluded that supervision by observation with the use of a checklist does contribute to improved performance by allowing the supervisor to correct errors through targeted feedback and by motivating health workers to execute each task correctly.

DISCUSSION

The PRICOR series of systems analyses in 12 countries shows that under widely varying circumstances it is possible to examine service delivery through systematic

review of health worker performance. Further, it is possible to use assessment data to identify program deficiencies and devise practical solutions. These confirmations have set the stage for widespread introduction and institutionalization of quality assurance measures in LDC health care systems.

Through the creation of Primary Health Care Thesaurus, PRICOR has established norms, or practice parameters, against which service quality can be compared. Child survival services are well suited to explicit evaluation criteria, since procedures generally follow World Health Organization guidelines and thus should be implemented uniformly, even internationally. PRICOR experience has shown that this consistency in treatment protocols allows for the use of standard observation instruments by observers with modest technical knowledge.

The results of the quality assessment studies served two purposes. Within countries, the data provided program managers with detailed, quantifiable information concerning health worker performance of specific tasks, allowing them to identify program weaknesses and target corrective action. Secondly, through comparative analyses of the data collected from multiple countries, PRICOR drew some general conclusions about the effectiveness of common implementation strategies for primary care interventions, thus identifying for program planners those service delivery components that may require reorientation or additional support. The results of the quality assessments should be reviewed with one caveat: the PRICOR methodology is a tool for management and not for empirical research. It is used to *identify* program weaknesses rather than test a hypothesis. In light of this purpose, PRICOR used samples considered by managers to be representative of the program, even where this strategy required deviation from strictly random sampling.

The findings of the systems analyses indicate certain program deficiencies that appeared repeatedly in multiple service delivery systems. For example, the counseling provided by health workers to caretakers was particularly weak. Health workers commonly failed to explain to caretakers appropriate home treatment, to describe danger signs that warrant medical attention and to ask mothers to repeat essential instructions to verify understanding. Further, at the time of treatment, health workers frequently did not communicate to caregivers such information as the child's nutritional status, the type of vaccine being administered or the purpose of prescribing oral rehydration solution. Such failures in client education are particularly serious in the context of primary health care, where the health care provider and the patient (or caregiver) are supposed to enter into a partnership to achieve successful treatment.

Widespread deficiencies were also identified in supervisory performance. Despite a hierarchy which sanctions routine monitoring of health workers, supervision systems have little or no focus on technical quality. In most service delivery systems, supervisors were not in the habit of observing health workers activities, correcting errors or initiating problem solving. As a result, supervisors had no accurate measure of how well health workers were carrying out their activities. In the cases in which supervisors' perceptions were compared to actual health worker performance, the supervisors commonly overestimated the quality of care. Supervisory visits were often devoted to routine administrative tasks such as review of treatment registers and inventory control. The systems analysis results clearly pointed to the need for providing supervisors with training and tools for carrying out performance assessments and problem solving.

The most encouraging finding uncovered by PRICOR is that many program deficiencies are in fact amenable to improvement. While limitation of resources is a universal feature of the delivery systems studied, many deficiencies did not appear to be related to resource availability. Among the 110 operations research studies sponsored by PRICOR to investigate and resolve problems, a number of low cost interventions were derived which proved successful.

The recently initiated Quality Assurance Project will build on the PRICOR techniques for quality assessment and problem solving in designing and implementing strategies for sustained improvement in LDC primary health care. To promote the institutionalization of quality assurance measures, the Project will modify systems analysis techniques to allow routine, targeted service quality assessments. Additionally, the Project is developing ways of incorporating into LDC primary health care systems a number of principles of Continuous Quality Improvement currently employed in industrialized nations [15]. For example, the Quality Assurance Project will encourage institutional commitment to quality that begins at the highest level of management. The Project will facilitate a team approach to quality assessment and problem solving that engages personnel ranging from policymakers to front line health workers. Further, emphasis will be placed on the utility of service quality data for program planning and management; information systems will be upgraded to facilitate a reciprocal flow of information regarding program deficiencies and improvements in service quality. Directing greater attention toward client satisfaction, health programs will be responsible for educating patients and caregivers, thus creating an external demand for quality. Finally, the process promoted by the Quality Assurance Project will be iterative, one which includes processes and mechanisms which facilitate continuous, incremental improvement in quality of care. The strategy of the Quality Assurance Project includes an operations research component to assess the feasibility and cost-effectiveness of various techniques for continuous quality improvement.

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