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SKILLS ASSESSMENT IN PRIMARY HEALTH CARE TRAINING

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Skills Assessment in Primary Health Care Training

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SUMMARY

This paper describes the development and field testing of a competency-based approach for the evaluation of primary health care (PHC) training programs. Despite their importance in PHC programs, inservice training activities are rarely evaluated on the basis of objective assessments of changes in skill levels. We developed structured skills assessment procedures to evaluate the outcomes of an ongoing training program for PHC Managers in Niger State, Nigeria. Participants were asked to perform selected tasks before and after a two-week training course. Trained observers assessed participants' performance using standardized checklists. The mean pre-training score for all skill areas was 27.4 on a scale of 100, and the mean post-training score was 43.1, a relative increase of 57.3%. Relative percent increases from pre- to post-training ranged from 32.6% in participants' skills as trainers to 90% in their ability to assess and treat diarrhoea. The findings were used in Niger State to strengthen the training program and provide targeted supervision for course participants. Several limitations of the skills assessment method were identified, and modifications are recommended. Quantitative behavioral assessment methods should play an important part in training evaluation.

INTRODUCTION

Service quality is an important determinant of the success of primary health care (PHC) programs. Training can improve and maintain service quality and plays a critical role in determining whether PHC programs are sustained after reductions in donor support.[1] In addition to the initial training that prepares a health worker to assume a position (preservice training), training for those already delivering PHC (inservice training) is essential to ensure that their skills are maintained and updated.

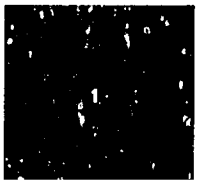
Despite the importance of inservice training in the achievement of PHC goals, little attention has been directed to the evaluation of such training. Most reports of PHC training include only the number of persons who attended training sessions and occasionally the results of a pre- and post-test of the participants' knowledge. Experience in medical education and the assessment of physicians' skills, however, indicate little relationship between performance on written examinations and clinical performance,[2] or between the behaviors of physicians during a clinical session and the information recorded in the medical chart.[3] Further evidence that "knowing" is not "doing" can be drawn from studies of the relationship between cognitive knowledge of health risks and changes in behavior to reduce or avoid such risks.[4,5]

Field based follow up evaluations of PHC training programs are rare but suggest that expected improvements in performance often do not materialize after training. In evaluating a training program for the clinical management of diarrhoea in Peru, for example, Salazar Lindo and his colleagues[6] found that, although written pre- and post tests showed a significant increase in knowledge about diarrhoea case management, assessment of health workers in the field before and after training indicated only limited improvement in performance. It is not known whether health workers had not mastered the new skills during the training program or new skills were mastered but not maintained once workers returned to their jobs.

Assessing the participants' skill levels should be an essential component of all training programs. If the participants cannot perform the skills targeted by the course objectives at the close of training, the training program needs to be improved. If the participants demonstrate end-of-training mastery of the skills but do not practice these skills when they return to the field, then more effort must be directed to identifying and reducing barriers to correct performance at the community and clinic levels.

The assessment of trainee skills has a long and controversial history in medical education.[3,7-13] The controversy, however, surrounds the method for assessing clinical competence, not the need for competence assessment. Competency exams have been recognized as an important quality assurance strategy by training and human resource development experts.[14]

The recommendation that competency-based assessments be used in PHC training has been made by Abbatt.[15] Based on the work of Harden and his colleagues,[12] Abbatt developed guidelines and collaborated in the implementation of such methods as the "Objective Structured Practical Examination" (OSPE) for the retraining of Medical Officers of Health with responsibility for maternal/child health and family planning in Bangladesh, and for Community Health Workers participating in training programs for the case management of acute respiratory infections (ARI) in Kenya.[16] While Abbatt has used the OSPE primarily as a tool for assessing (or grading) student performance, in Kenya the method was designed as a strategy for evaluating the ARI training course. The OSPE method has also been taught to participants in the "Teaching Primary Health Care" course offered by the Liverpool School of Tropical Medicine. These efforts have primarily been directed to training programs of at least three months' duration.



INTRODUCTION

As defined by Abbatt,[15] the OSPE is a way of organizing the assessment of skills taught in training programs. It allows trainers to assess manual, decision-making, and communication skills, as well as knowledge, by having participants perform specified tasks while trained observers evaluate their performance with standardized checklists. The OSPE offers advantages over more traditional post-test assessments of participants' learning because it permits the assessment of skills and produces relatively reliable results.

There is an urgent need for skill-based methods of evaluating PHC inservice training programs. These methods must be appropriate for training program personnel in developing countries—straightforward, inexpensive, and designed to contribute to the overall quality of the training program.

METHODS AND MATERIALS

DESCRIPTION OF THE INSERVICE TRAINING PROGRAM

In Niger State, Nigeria, health supervisors and managers at the district level[a] participated in a two week course designed to improve their skills in community needs assessment, calculating rates of service utilization among target populations, treatment of diarrhoea, and planning and conducting inservice training for the health workers they supervise. The content of the training was based on four curriculum manuals drawn from a series adapted by the Nigerian Ministry of Health from models developed by the World Health Organization.[b] Training methods emphasized participatory approaches and the practical application of skills.

In order to include all PHC managers in Niger State, the course was conducted three times for different trainees: in October 1989, with 23 participants; in May 1990, with 28 participants; and in January 1991, with 23 participants. The courses are part of a larger continuing education program that includes ongoing inservice training and supervision carried out by the Continuing Education Unit (CEU) of the Niger State Ministry of Health. The Ministry of Health is evaluating the continuing education program through a variety of methods, including facility-based assessments of health worker performance and program reviews by State- and National level public health professionals.[c]

DEVELOPMENT OF THE SKILLS ASSESSMENT EXERCISE

We developed a skills assessment exercise to assess participants' skill levels before and after the two week course by using the approach of Abbatt's OSPE[15]. We abstracted the objectives to be assessed directly from the four manuals used in the course curriculum. The assessment consists of a number of "stations" at which the participant answers a written question or performs a practical task. We designed each station, or set of stations, to assess whether participants had mastered a specific training objective. The Niger State OSPE included 21 stations (Table 1).

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[a] The Nigerian equivalent of a district is called a Local Government Area.

[b] Full descriptions of the larger program and the assessment method are available from the Continuing Education Unit in Niger State and the offices of the Combatting Childhood Communicable Diseases (CCCD) Project in Lagos or Kaduna, Nigeria.

Table 1. Training Manuals and Tasks for Skills Assessment Stations
Continuing Education Unit
Niger State, Nigeria

TRAINING MANUAL		STATION TASK
KNOW AND INVOLVE THE COMMUNITY	1	IDENTIFY BARRIERS TO HEALTH SERVICES
	2	CALCULATE ACCESS TO SERVICES
	3	IDENTIFY HEALTH PROBLEMS FROM CLINIC RECORDS
	4	INTERVIEW COMMUNITY MEMBER
	5	PLAN FOR MEETING WITH VILLAGE ELDER
	6	MEET WITH VILLAGE ELDER
TREAT DIARRHOEA	1	ASSESS CHILD WITH DIARRHOEA
	2	ASSESS DEGREE OF DEHYDRATION AND PRESCRIBE TREATMENT
	3	EDUCATE MOTHER ABOUT DIARRHOEA TREATMENT
	4	DEMONSTRATE HOW TO MIX REHYDRATION SOLUTION
	5	ASSESS STORAGE AREA FOR DEHYDRATION TREATMENT SUPPLIES
	6	IDENTIFY PROBLEMS IN SUPPLY STORAGE
SET TARGETS	1	PERFORM BASIC MATHEMATICAL SKILLS
	2	ESTIMATE PAST USE OF HEALTH SERVICES
	3	CALCULATE PAST USE OF A HEALTH SERVICE FOR ONE YEAR
	4	CALCULATE HEALTH SERVICE USE RATE
PLAN AND CONDUCT TRAINING	1	IDENTIFY TRAINING TASKS
	2	SELECT TRAINING METHODS
	3	PLAN A TRAINING ACTIVITY FOR ONE TASK
	4	TRAIN A HEALTH WORKER FOR ONE TASK
	5	MONITOR HEALTH WORKER PERFORMANCE AND EVALUATE TRAINING

The staff of the Niger State Continuing Education Program (CEU) reviewed and revised all station descriptions, instructions, and observation checklists.* Case histories and practical tasks were based on clinic records, sociological and cultural information, and geographic features characteristic of Niger State. Figure 1 presents a sample station designed to assess competence in educating mothers about home treatment of dehydration.

* These materials are available from the Ministry of Health in Niger State, Nigeria or the International Health Program Office, Centers for Disease Control and Prevention, Atlanta, Georgia, USA.

FIGURE 1

Example of Station from Skills Assessment Protocol, Niger State, Nigeria.

STATION 9: EDUCATE MOTHERS ABOUT DIARRHOEA TREATMENT

INSTRUCTIONS FOR PARTICIPANTS:

YOU ARE THE HEALTH WORKER IN A CLINIC. HANATU'S MOTHER CAME TO SEE YOU THIS MORNING BECAUSE HER CHILD HAD DIARRHOEA. YOU PRESCRIBED ORAL REHYDRATION SOLUTION (ORS) AND THE MOTHER HAS BEEN ADMINISTERING ORS TO HER DAUGHTER UNDER YOUR SUPERVISION FOR FIVE HOURS.

YOU JUST EXAMINED HANATU AND THE SIGNS OF DEHYDRATION ARE GONE. SHE AND HER MOTHER ARE READY TO GO HOME, SO YOU WANT TO TELL HER MOTHER ABOUT HOME CARE FOR A CHILD WITH DIARRHOEA. MEET WITH HER NOW AND TELL HER WHAT SHE NEEDS TO DO. (DO NOT MIX HOME SOLUTION AT THIS TIME.)

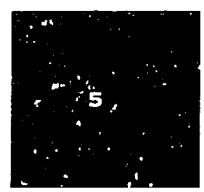
MATERIALS NEEDED: DOLL, THREE CHAIRS

PERSONNEL NEEDED: PERSON TO ROLE PLAY AS MOTHER
OBSERVER

ANSWER KEY: (CHECKLIST)

DOES PARTICIPANT:	YES	NO
EXPLAIN THAT IF CHILD HAS DIARRHOEA SHE SHOULD GIVE MORE FLUIDS THAN USUAL?	|__|	|__|
TELL HER TO GIVE FLUID AFTER EACH STOOL?	|__|	|__|
TELL HER TO CONTINUE FEEDING AND BREASTFEEDING?	|__|	|__|
TELL HER TO RETURN IF THE CHILD DOES NOT GET BETTER?	|__|	|__|
EXPLAIN THE SIGNS OF DEHYDRATION?	|__|	|__|
TELL MOTHER HOW TO PREVENT DIARRHOEA?	|__|	|__|
ASK MOTHER TO REPEAT WHAT SHE HAS LEARNED TO CHECK HER UNDERSTANDING?	|__|	|__|

SCORING: ASSIGN A SCORE OF 1 FOR EACH "YES" ANSWER ABOVE AND WRITE SCORE AT TOP OF CHECKLIST. (MAXIMUM SCORE: 7)



PROCEDURES

Course trainers conducted the OSPE twice during each course: immediately before the course began and just before the closing. Students at the PHC training institute[d] where the courses were conducted were trained to role-play community members and clients for interactive tasks.

After an explanation of the procedures and a tour of the stations, we assigned each participant to a "start" station. Participants read the instructions at the station and completed the assigned task. For practical tasks, a trained observer used a standardized checklist to record each participant's performance. After five or seven minutes, the session ended and participants had two minutes to move to the next station. This process was repeated until each participant had completed the 21 stations.

In October 1989, 16 of the 23 PHC managers and supervisors attending the workshop participated in the OSPE. Completion of orientation to the OSPE and the 21 stations (at five minutes per station and two minutes between stations) required approximately three hours. Courses offered later had more than 21 participants in the OSPE and required two administrations.

Participants gave their answer sheets to course trainers immediately after finishing the examination. Trainers scored the answer sheets as a group to increase reliability. Questions or ambiguities in scoring were resolved by consensus.

DATA SUMMARY AND FEEDBACK TO PARTICIPANTS

We weighted the number of points awarded at each station so that each of the four manuals accounted for approximately one fourth of the total exam score. The total score for the 21 stations was 100 points.

As soon as possible after the post-workshop OSPE, (usually during a plenary session the next morning), trainers reviewed the results with participants to provide feedback on their performance. Trainers described and, for practical stations, demonstrated correct performance of each task, while participants reviewed their answer sheets. CEU staff then filed the answer sheets for later use in planning individual training and follow-up supervision during field visits.

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[d] The School of Health Technology in Minna, Niger State.

RESULTS

Performance levels and rates of increase in skill levels during the training period were similar for the earlier and later courses. The May 1990 assessment includes the largest number of participants (N=28), and we had improved the methodology based on findings from the 1989 assessment. Results below are only for the May 1990 course. We did not aggregate scores across courses because administration procedures and time-per-station varied slightly between courses.

The mean pre-training score for all manuals was 27.4 out of 100, and the mean post-training score was 43.1, a relative increase of 57.3%. Figure 2 shows pre- and post-test scores for each of the four manuals scaled to 100%. Relative percent increases from pre- to post training ranged from 32.6% in participants' skills as trainers to 90% in their ability to assess and treat diarrhoea. We also totaled the unweighted scores for tasks related to each manual and scaled them to 100% to allow comparisons. Figure 3 presents sample results for individual stations related to the manual on diarrhoea case management.

FIGURE 2

Skills of PHC Managers Before & After Course
By Training Topic Area, Niger State, Nigeria, May 1990

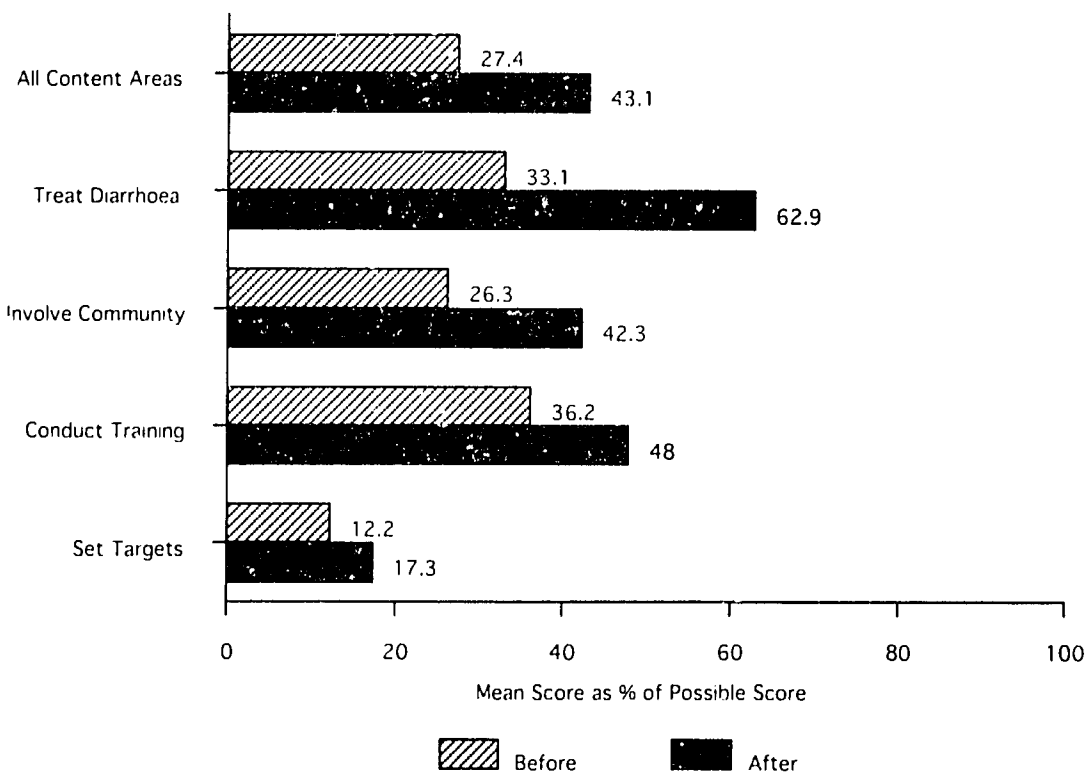
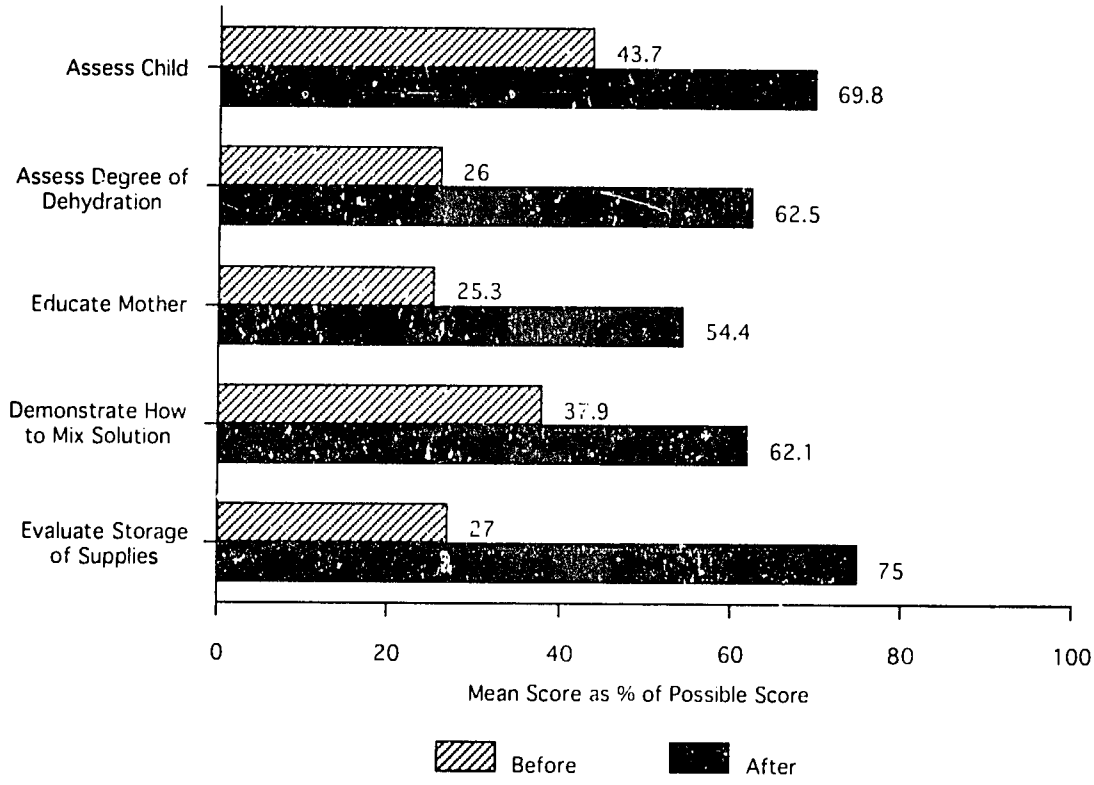


FIGURE 3

Competence of PHC Managers in Case Management of Children with Diarrhoea Before & After Course, Niger State, Nigeria, May 1990

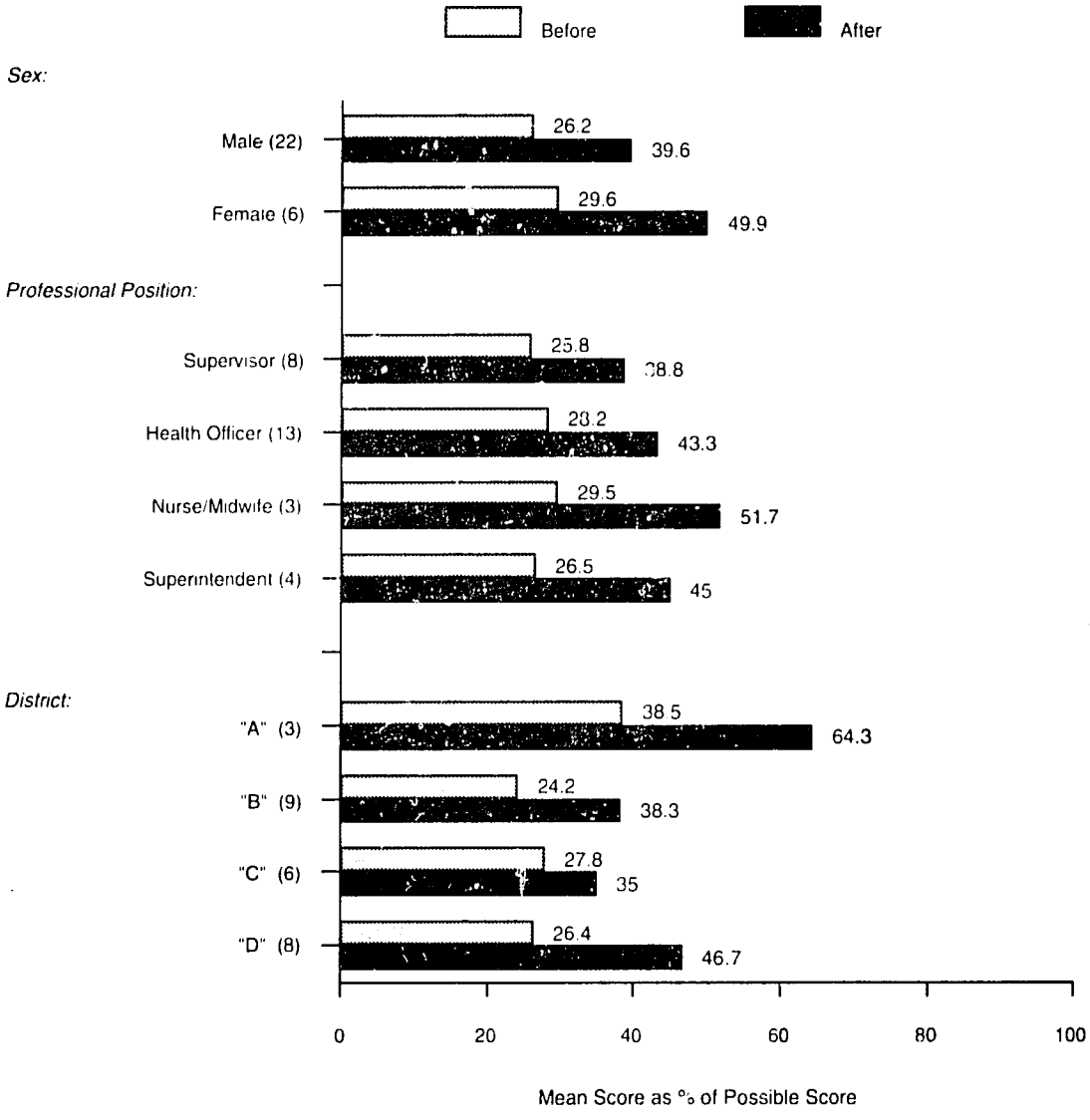


We analyzed the pre- and post-training scores by the sex, professional position, and home district[c] of the participants (Figure 4). There were no significant differences by sex. Scores at both pre- and post-training were higher among nurses and health officers than among participants in other professional positions, although the samples are too small to achieve statistical significance. Participants from District "A" performed considerably better than those from the other three districts both before and after the training. Course trainers attributed this difference to the fact that the "A" district is the practice site for the preservice PHC training institute, and PHC managers from this district could have learned some of the targeted skills prior to the training program. The relative increase in skill levels for participants from District "A" (67%) was second only to that of participants from District "D", showing that even those with some knowledge of the target skills can benefit from the Supervisory and Managerial Skills course.

[c] District names have been changed to alphabetical labels.

FIGURE 4

Competence Before & After Course By Sex, Professional Position, and District, Niger State, Nigeria, May 1990



DISCUSSION AND CONCLUSIONS

The use of a practical skills assessment exercise in inservice training for PHC workers contributed to the quality of CEU training activities. It emphasized the importance of skill mastery as the primary objective of the training program, and allowed trainers to conduct additional systematic observations of participants' skills.

The skills assessment also demonstrated that while dramatic improvements in skills can result from training programs, all material covered in the curriculum is not mastered by participants. The tendency to assume that health workers' performance will improve because they have participated in a training course is widespread, and has been reinforced by evaluations of training that measure success only by the number of participants. The fact that participants from District "A" improved their competence levels despite their previous inservice training suggests that improvements in training quality or repeated training may be needed for skills to reach desired levels. Clearly, the results of skills assessment procedures can reduce unrealistic expectations about training programs and focus attention on the types and intensity of training needed to achieve acceptable performance levels. In Niger State, comparison of post-training skill levels and follow-up assessments of performance in the field suggested that both training follow-up and clinic-based supervision are essential parts of the overall continuing education strategy.[18]

In Niger State, the OSPE results indicated that some areas of the curriculum were mastered by participants during the two-week training period, while others (notably the setting of program targets) showed little or no improvement from pre- to post-training. Review of these results after the first course led to several modifications in the curriculum. We introduced additional sessions in basic mathematical skills, we reorganized the order in which trainers taught the course manuals to ensure that the target-setting content was taught in conjunction with a more general introduction to health program evaluation, and we emphasized that the participants should master mathematical skills during their training. Despite these extra efforts, however, performance levels in "Set Targets" remained very low. This raises questions about the appropriateness of that portion of the curriculum, and whether responsibilities requiring target-setting skills should be reassigned from district-level health managers to a more central level of the public health system. The OSPE results on target-setting skills aptly illustrate how useful skills assessment can be for the design and evaluation of training programs.

Skills assessment techniques can contribute to the quality of PHC training in the following ways:

1. They ensure that trainers focus on the transfer and mastery of skills, in addition to the more cognitive aspects of the curriculum.
2. They allow each participant additional practice of targeted skills under the close observation of a trainer.
3. They provide quantitative data on participants' mastery of skills, documenting that brief courses often do not allow adequate time for skill practice and mastery.
4. They provide information needed by trainers to improve their curricula and methods.
5. They provide a basis for planning follow-up and individual training during supervisory visits.

Nonetheless, the OSPE has several limitations. First, the OSPE may have underestimated the competencies of the participants. Measurement error is a serious threat to validity in all testing,[19] and may be particularly problematic during test development. When two of the authors (AV & AA) asked participants to repeat selected tasks after the completion of the May 1990 OSPE, participants performed considerably better than they did in the assessment. This low achievement on the assessment may be due the pressure and time constraints of the assessment environment, the fact that English is a second language for course participants, unclear instructions, or

participant confusion about what was expected of them. Course participants reported, for example, that they found some of the written instructions at the stations difficult or confusing and the time allowed for some of the tasks too brief. We will continue to investigate these problems. Performance pressure might be reduced by lengthening the time for each station. Inappropriate reading level and unclear task instructions can be improved during field trials and revisions of the materials. Confusion about procedures or expectations can be addressed through better communication.

A related threat to validity is the extent to which a single observation of task performance can provide an accurate measure of competence. Studies of clinicians' performance indicate that the quality of service varies widely from one patient to the next.[8] For the assessment of clinical competency, evaluation of multiple encounters is now recommended. Stillman and her colleagues reported, for example, that reliable and reproducible scores in history-taking, physical examination, and communication skills can be obtained in about one day of testing per student.[8] Obtaining valid estimates of skill levels in differential diagnosis and laboratory utilization required more observations over a longer time. In Niger State, the tasks being assessed were much simpler than those faced by medical residents, and specific performance guidelines were taught in the training course. Repeated measures of individual performance on each task may not be necessary under such conditions. Still, variations in a participant's performance over repeated trials should be addressed. Both for mastery training and evaluation, procedures allowing repeated task performance with immediate feedback are recommended, continuing until mastery is demonstrated for several sequential trials (asymptotic performance).

A second limitation is the reliability of the scoring criteria and assessment results. Observations of several administrations of the OSPE suggest that 1) the behavior of simulators and the arrangement of materials at stations sometimes varied across participants or administrations of the OSPE; 2) there were no formal assessments of the consistency with which participants were observed and scored at the practical stations; and 3) scoring criteria, even when discussed in a group, were not always consistent.

These two limitations can be addressed by developing more specific guidelines for OSPE implementation and perhaps more thorough training of the trainers and role-players who carry out the OSPE. Experience with observational studies of health care service delivery in developing countries suggests that high inter-rater reliability rates can be achieved and maintained through adequate training and supervision.[18]

The third limitation is the space, time and effort needed to carry out an OSPE. Space may pose a particular challenge in developing countries. Although the stations can be outdoors and there can be more than one station in a room, the use of 21 stations in Niger State disrupted the normal activities of training institute staff.

Time can also be a problem. While a one- or two-day skills assessment exercise is commonplace in training programs that last for longer than three months, the same rigor before and after a course that only lasts several weeks can be counterproductive. In addition to administering the assessment, trainers spend time on setting up the OSPE and scoring the results. While increasing the time at each station may improve the validity of results, it also increases the time needed to complete the OSPE.

The human resources needed to carry out an OSPE can be formidable. Implementation of the assessment in Niger State required 15 persons: seven observers, two persons to monitor procedures and guide participants as they moved from one station to the next, and six persons to role-play mothers and community members. We consider this a minimum. Observers and role-players had to work continuously throughout the administration period, possibly jeopardizing the consistency of their performance. In Niger State, students at the training institute served

effectively as both observers and role-players after only a brief training period, suggesting that the personnel requirements of the OSPE may be met without overtaxing trainers.

Personnel in Niger State have enthusiastically endorsed the OSPE, and are now serving as consultants in its use to other Nigerian States. Nonetheless, alternatives should be developed that require fewer resources yet do not compromise the essential contributions of the approach, particularly for short courses. We need to assess the competencies of PHC training participants in practical ways that 1) contribute to the overall training program by providing opportunities for supervised practice of skills and feedback during the course; 2) provide meaningful data on the extent to which targeted competencies are mastered during the training; 3) allow revision of curricula; 4) can be used for systematic follow-up in field settings; and 5) allow quantitative evaluation of the effects of training interventions on health worker competence.

We are addressing this challenge in several ways. First, we are developing a simple, version of the OSPE used in Niger State that combines related stations into a smaller number of integrated performance tasks. For example, a single station for the case management of a child with diarrhoea would replace the six stations used in the Niger State OSPE. At this integrated station, the participant will be asked to assess and diagnose the illness, treat the child, and educate the child's caretaker. This integrated assessment is identical to that used in the field assessments of health worker performance in Niger State and other African countries[18] and is expected to significantly reduce both the time and complexity of the overall OSPE. In a related improvement, however, sufficient time will be allowed at each station to provide immediate feedback to participants. This will reduce the time saved by the integrated station approach.

Another approach being developed is to incorporate the OSPE into the training course itself and to use peer assessments to obtain quantitative performance scores. Trainers introduce a new skill through lecture and demonstration, and participants then divide into small groups for practice and skills assessment. Each participant performs the skill while others in the small group observe and record performance on standardized checklists. Participants give feedback immediately, and the completed checklists are collected for later summary. This results in a quantitative record of how well each participant was able to perform. This record will have a positive bias, because performance will improve among those who demonstrate their skills after observing and providing feedback to others. Some reduction in the reliability (and therefore validity) of the resulting scores can also be expected if peer scoring is used. Balancing these drawbacks, however, are several important advantages. This approach will promote mastery of skills, provide a measure of post-training competence, and give participants a chance to observe and practice effective supervisory and feedback skills. This approach removes the need for a separate assessment activity at the close of the training period and divides responsibility for set-up and scoring among trainers and participants.

We are also continuing to improve the quality of PHC training, with the goal of achieving higher levels of competency among participants. Skills assessment activities are only one part of the effort to improve the quality and outcomes of PHC training programs.

In summary, the goal of PHC training courses is to improve health worker skills, and in turn, service quality. Mastery of knowledge is not sufficient to ensure that skills can be performed competently. The use of competency-based skills assessments for evaluating training courses can lead both to better training and more effective follow-up and supervision. Full-scale implementation of an OSPE, however, may not be practical for short courses of the type frequently used for inservice PHC training. Future work must focus both on improving the quality of PHC training and on developing skills assessment methods that can be sustained by PHC training personnel without external assistance. PHC trainers can contribute to this effort by publishing descriptive or analytical reports of their activities, and especially of their efforts to evaluate the competence of course participants.

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