OPERATIONS RESEARCH SUMMARY

QUALITY ASSURANCE PROJECT

Improving Adherence to Treatment for Childhood Pneumonia in Rural Niger

One factor linked both to the development of drug resistance and to adverse health outcomes is poor patient compliance with the prescribed drug treatment. Even when drugs are correctly prescribed and the patient/caretaker is carefully counseled, the patient/caretaker often forgets, prematurely discontinues, or interrupts the treatment regimen. The Quality Assurance Project (QAP) undertook a study in Niger to improve adherence to cotrimoxazole therapy, the antibiotic recommended there for treating childhood pneumonia.[1]

Programs

Job aids have proven effective in improving health worker performance in many circumstances. QAP designed and tested a program of job aids for health workers (primarily nurses) and caretakers (primarily mothers) aimed at improving cotrimoxazole adherence. The job aids included a simple, low-cost envelope to hold the pills given to caretakers, and counseling cards and a poster for clinics to remind health workers to advise caretakers on storing, crushing, and administering the medication. All the job aids presented largely identical messages through drawings that illustrated key behaviors such as giving two pills per day for 5 days and storing pills out of reach of children. The job aids were supplemented with training in counseling techniques for the health workers.

A second program addressed the number of doses of cotrimoxazole given to caretakers at the first visit. Although the recommended full course is 5 days and the Niger Ministry of Health recommends giving all 5 days of pills to caretakers at the first visit, many health workers were not doing so. At the start of the study, most caretakers received only 3 days of treatment for various reasons (e.g., low inventory, to encourage mothers to return for follow-up visit, health worker misunderstanding of prescription policy). Midway through the study, all clinics were reminded of the policy, were given extra cotrimoxazole, and began enforcing the full dose.

Methods

The study used a quasi-experimental design in 4 program and 4 control clinics. One nurse at each clinic treated most childhood pneumonia cases and was the nurse included in the study. Half the study nurses were professional nurses (comprehensive 3-year nurse training) and half were technical nurses (2-year basic training) in both program and control groups. The job aids and health worker training were introduced in the program clinics while the control clinics provided the usual care without the job aids or training. The dependent variable, adherence to cotrimoxazole, was measured (by a pill count) for all program and control clinics.

After the job aids and training were implemented in the program clinics, 677 caretakers were enrolled at the 4 program (n = 348) and 4 control clinics (n = 329) over a 4-month period. An initial interview collected information on how many days of pills were prescribed by the nurse at the initial clinic visit. All caretakers were interviewed in their homes and the number of

[1] The study reported here is more fully described in two documents. The job aids and process for their development are in WN Edson, P Koniz-Booher, M Boucar, S. Djbrina, and I Mahamane. 2002. The role of research in developing job aids for pneumonia treatment in Niger, *Intl. J. for Quality in Health Care* 14 (Supp 1), 35–45. The study methodology and results are in WN Edson, M. Boucar, S. Djbrina, I Mahamane, and H Ware. 2002. Improving Adherence to Cotrimoxazole for the Treatment of Childhood Pneumonia in Niger, *Operations Research Results* 2(10). Bethesda, MD: Published for the U.S. Agency for International Development by the Quality Assurance Project (QAP). The latter is available at www.qaproject.org.

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remaining pills was counted 4 or 5 days later. The study nurses were also observed during clinic visits before and after the job aids were introduced. Near the end of the study, the job aids and training were implemented in the control clinics.

Results

Impact of job aids: Program caretakers did significantly better than the controls: 90% of the program caretakers gave exactly the number of pills prescribed at the initial visit versus only 76% of the controls ($p < .001$). Overall adherence, as measured by the percentage of children who took the full course of medicine whether or not they were prescribed the full course at the initial visit, was 68% in the program group versus only 56% in the controls. The key finding: Nearly all of this difference was due to improvements by technical nurses. While professional nurses in the program and control clinics were similarly excellent in guiding caretakers toward high adherence, the technical nurses—who had more room for improvement than the professional ones—did far better when supported by job aids and training. The interaction between type of provider and use of job aids had a significant effect on patient adherence. This result is illustrated in Figure 1, which uses the concept of "pill ratio": the number of pills actually used ÷ the number of pills recommended to have been used as of the home visit.

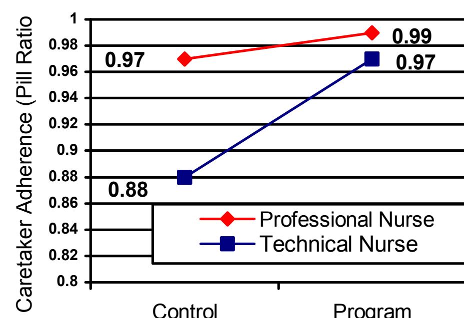

Fig 1. Caretaker Adherence by Type of Nurse

While job aids had clear impact on patient adherence, they had mixed results on observed nurse practices. Most nurse practices were similar in program and control groups, but program nurses were substantially better at demonstrating good practice to caretakers. No difference was observed in caretaker knowledge between program and control groups.

Impact of initially prescribed dosage: As expected, children prescribed the full course at the initial visit were more likely to complete it than those initially prescribed only a partial course, but the impact was larger than expected: Overall adherence was 75% in cases receiving 4–5 days of pills at the initial visit and only 54% in cases receiving 1–3 days' worth: a 21 percentage point difference. The impact of initial dosage was apparent in both the program and control groups, but had more effect on the control (41% vs. 75% overall adherence) than program group (63% vs. 76%) (Figure 2).

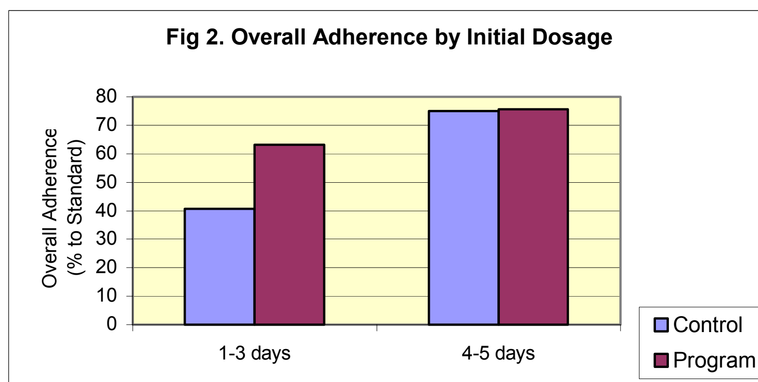

Fig 2. Overall Adherence by Initial Dosage

Other factors and multivariate analysis: The cited study report discusses several other factors, such as underdosing by the child's age when prescribing, child health outcomes, caretaker and household characteristics, and significant clinic-related effects on adherence. A multivariate analysis supported the results summarized above.

Discussion

This study yielded some important results for developing countries. It adds to evidence that well-designed job aids can improve health worker performance, and extends that evidence by showing how a system of job aids can improve both health worker and client performance, specifically to increase adherence to medication for childhood pneumonia. Perhaps more important, it confirms and extends an earlier report that job aids may be more effective when used by health workers with less education and experience, and demonstrates that this finding applies not just to the health worker's adherence to recommended practices but also to the impact of health worker practice on client behavior. Finally, it provides a rare quantification of the magnitude of the impact on adherence of full versus partial initial dosage. This finding strongly supports a policy of providing the full course of cotrimoxazole treatment at the initial visit as well as special effort to maintain adequate inventories of essential medications at clinics.

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