Short Communication

A Pilot Test of the Addition of Zinc to the Current Case Management Package of Diarrhea in a Primary Healthcare Setting

*†Nita Bhandari, †Sarmila Mazumder, †Sunita Taneja, †Brinda Dube,
‡Robert E. Black, §Olivier Fontaine, ‖Dilip Mahalanabis, and *Maharaj Kishan Bhan

Department of Pediatrics, All India Institute of Medical Sciences, New Delhi, India; †Society for Applied Studies, Regional Center, New Delhi, India; ‡Bloomberg School of Public Health, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Maryland; §Department of Child and Adolescent Health and Development, World Health Organization, Geneva, Switzerland; ‖Society for Applied Studies, Registered Office, Kolkata, India

ABSTRACT

Zinc is recommended for the treatment of acute diarrhea in children but the effect of its introduction on drug and oral rehydration solution use is unclear. Government care providers, private practitioners and community workers were trained to distribute zinc and oral rehydration solution to children seeking care for diarrhea. Periodic surveys showed that village-based workers became a common source of diarrhea treatment and private practitioners were used less. Zinc was used in approximately half of the episodes; the prescription and use rates of oral rehydration solution packets increased from 7% at baseline to 44.9% 6 months later. Reduction in use of drugs during diarrhea ranged from 34% for tablets to 64% for injections 6 months later. The cost of treatment to families declined significantly. These findings need confirmation in a randomized controlled trial. *JPGN 41:685–687, 2005.* **Key Words:** Zinc, diarrhea, oral rehydration salts, care providers. © 2005 Lippincott Williams & Wilkins

INTRODUCTION

Placebo-controlled efficacy trials using zinc supplements to treat acute diarrhea along with oral rehydration solution (ORS) therapy in young children have shown a significant reduction in the duration of treated episodes and their severity as measured by diarrhea stool output or frequency (1,2). Diarrheal and respiratory morbidity were also reduced over 4 to 8 weeks after recovery from the zinc treated diarrheal episode (3). Because of substantial intestinal losses of zinc during acute diarrhea, it is likely that zinc deficiency develops in children during the illness and immediately following it and this may explain the beneficial impact even after discontinuation of the supplement (3).

These trials were done in developing countries, including India. Subsequent to World Health Organization recommendations (4), the Indian Academy of Pediatrics also endorsed zinc use for 10 to 14 days during an episode of acute diarrhea in children aged 1 month to 5 years (5).

The issue now is whether zinc should be introduced in primary healthcare programs for treatment of acute diarrhea. Although the evidence for efficacy is strong, information is required on how the introduction of zinc will affect ORS use rates and drug and antibiotic prescription by healthcare providers during diarrhea. We therefore conducted a pilot study where zinc was distributed to young children with diarrhea seeking care from public or private sectors in a rural setting.

PATIENTS AND METHODS

The setting was the primary health center of Tigaon (population ~33000) in Faridabad district in the state of Haryana, India. Formative research identified perceptions of caregivers regarding childhood diarrhea causation and management, care seeking sources and caregivers expectations from healthcare providers. Caregivers in households with children under 5 years old were interviewed in a cross-sectional survey

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to ascertain family characteristics, ORS prescription and use rates, drug prescription rates by healthcare providers and other variables of interest. In partnership with the local government, channels for distribution of zinc and ORS packets were defined. These included government providers (physicians and auxiliary nurse midwives at the primary health center), private practitioners and community workers—the "Anganwadi workers" under the Integrated Child Development Services Scheme of the Government of India; these workers do not treat diarrhea routinely. All channels were trained in diarrhea management, zinc distribution and use, and referral criteria, over a 2-day training period. The strategy was to give one strip containing 14 dispersible zinc tablets (20 mg each) along with 2 ORS packets to all children aged 1 month to 5 years visiting that channel with diarrhea. Infants aged less than 6 months were advised half a zinc tablet in a teaspoonful of breast milk; older children were advised 1 tablet in breast milk or clean water. After the training, project staff had no role in patient treatment. The messages imparted were carefully designed based on findings of the formative research. The effectiveness of this pilot program was assessed through two cross-sectional surveys, 3 and 6 months post-training.

Approvals were obtained from the ethical review boards of all participating institutions.

RESULTS

Of the total of 5266 households served by the primary health center, 2364 (44.9%) had one or more children aged between 1 month and 5 years. Interviews with caregivers could be conducted in over 95% households in the three surveys; the remaining were away. In the baseline survey, the median household income per year was ~USD 930. The mean (SD) years of schooling were 5.5 (4.7) for mothers and 9.0 (3.8) for fathers. Most (89%) mothers did not work outside the home.

Table 1 shows the sources of care used and treatment prescribed during diarrhea in the baseline and the two subsequent surveys for diarrheal episodes occurring in the previous 3 months. There was a shift in the source from which care was sought as compared with baseline; private practitioners were used less and the village-based Anganwadi workers became a common source. Care seeking from government facilities remained uncommon (2% at baseline to 5%, 6 months later; Table 1). The prescription of syrups, tablets, powders and injections during diarrhea and cost of treatment for the episode all decreased significantly (Table 1). Almost one third of caregivers had incurred no financial costs for treatment of the diarrheal illness 6 months after the start of the intervention, as compared with 2.4% in the baseline survey (Table 1). The prescription and use rates of ORS packets during diarrhea increased markedly from 7% at baseline to over 40% in the subsequent surveys (Table 2). Zinc tablets were prescribed in more than half of episodes 6 months after the start of the intervention. Whenever advised, zinc tablets were administered to the child (Table 2). At the 3- and 6-months surveys, 72% and 74%, respectively, reported giving the complete 14-day course.

DISCUSSION

Several lessons can be learnt from this pilot test. It was feasible to train various government and community channels and to promote zinc as a treatment for acute diarrhea through the primary healthcare system. Zinc tablets were well accepted by caregivers and children. Introduction of zinc did not reduce ORS use rates when both were promoted together. Sources close to home (Anganwadi workers and private providers) were preferred by families. Use of drugs, not routinely recommended for the treatment of acute diarrhea (4), declined, possibly because of the effect of zinc treatment in

TABLE 1. *Care seeking sources and treatment advised by them during diarrheal episodes in children aged 1 month to 5 years*

| | Cross-sectional surveys | | | P value | |
	Baseline	After 3 months	After 6 months	Baseline vs 3 mo‡	Baseline vs 6 mo‡
Source of care	(n = 797)*	(n = 1988)*	(n = 1030)*		
Primary health center	19 (2.4)	81 (4.1)	57 (5.5)	0.040	0.001
Private practitioners	648 (81.3)	1158 (58.2)	580 (56.3)	<0.0001	<0.0001
Anganwadi workers	3 (0.4)	510 (25.6)	266 (25.8)	<0.0001	<0.0001
From outside the village	127 (15.9)	239 (12.0)	127 (12.3)	0.007	0.032
Treatment advised	(n = 739)†	(n = 1717)†	(n = 909)†		
Syrups; identity unknown	671 (91)	1033 (60.2)	511 (56.2)	<0.0001	<0.0001
Tablets; identity unknown	178 (24.1)	248 (14.4)	142 (15.6)	<0.0001	<0.0001
Powders; identity unknown	545 (74)	763 (44.4)	369 (40.6)	<0.0001	<0.0001
Injections; identity unknown	428 (58)	564 (32.8)	190 (20.9)	<0.0001	<0.0001
Antibiotics and antidiarrheals	45 (6.1)	125 (7.3)	89 (9.8)	0.327	0.008
Total cost in Rupees; mean (SD)	113 (411)	59 (363)	48 (177)	0.002§	0.0001§
Incurred no financial costs; n (%)	20 (2.7)	452 (26.3)	269 (29.6)	<0.0001	<0.0001

*Number of sources visited.
†Number of episodes in the last 3 months.
‡χ^2 test.
§*t*-test for unequal variance.

TABLE 2. *Healthcare providers advice and caregivers practices regarding oral rehydration solution packets and zinc*

	Cross-sectional surveys			P value	
	Baseline	After 3 months	After 6 months	Baseline vs 3 mo*	Baseline vs 6 mo*
Number of episodes	739	1717	909		
Healthcare providers advice					
ORS packets	54 (7.3)	809 (47.1)	409 (44.9)	<0.0001	<0.0001
Zinc tablets	–	852 (49.6)	472 (51.9)		
Caregiver practices					
ORS administered	54 (7.3)	728 (42.4)	393 (43.2)	<0.0001	<0.0001
Zinc administered	–	839 (48.9)	469 (51.6)		

All values are n (%).
*χ^2 test.
ORS, oral rehydration solution.

reducing illness severity and duration, the availability of treatment in the village itself and reduced contact with private practitioners. These findings should be confirmed in cluster randomized controlled trials where communities receiving zinc and ORS packets for treatment of diarrhea are compared with those receiving ORS alone, including impact on additional outcomes such as diarrhea hospitalization rates and mortality.

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