PROMOTING ZINC AND ORS FOR THE MANAGEMENT OF CHILDHOOD DIARRHEA IN INDONESIA

A RESEARCH BRIEF

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EXECUTIVE SUMMARY

Zinc is an important component of the immune system. A zinc deficiency can increase the incidence and severity of many diseases, including diarrhea. Clinical research suggests that if children take 20 mg of zinc (10 mg for children under 6 months of age) for 10 to 14 days, the outcome is up to a 25 percent reduction in the duration of acute diarrhea and a 42 percent reduction in treatment failure or death cause by persistent diarrhea. An additional benefit of a complete zinc treatment course is the reduction of the reoccurrence of diarrhea for about three months. To prevent dehydration, children need oral rehydration therapy (ORT), including solutions made from oral rehydration salts (ORS), recommended home fluids, or increased fluid intake.[1] The Point-Of-Use Water Disinfection and Zinc Treatment (POUZN) project, a USAID Private Sector Program (PSP) initiative managed by AED, supports the introduction of zinc, in conjunction with ORT, for childhood diarrhea treatment.

When the POUZN project began in 2007 in Indonesia, zinc treatment for diarrhea was practically unknown and there were no manufacturers of zinc. Just three years later, Indonesia now has eight zinc pharmaceutical companies with 11 brands available nationwide. To accelerate zinc awareness to frontline health providers, POUZN implemented a targeted approach to midwives consisting of a training course given by the professional midwives association (IBI) followed by repeated detailing from zinc manufacturing partners.

An evaluation of POUZN's activities suggests:

DIARRHEAL TREATMENT PRESCRIPTION AND USAGE

- Caregiver zinc usage levels increased from 5 percent at baseline to 16 percent at end-line; however this difference was not significant. At end-line, caregivers who reside in Bandung City and Bandung District, where mass media messages promoting zinc were complemented by training to healthcare providers, specifically midwives, used zinc at higher rates than those who reside in West Bandung, a nearby area that was only exposed to mass media messages; again this difference was not statistically significant.

[1] POUZN Project. June 2010. *Treating Childhood Diarrhea with ORT and Zinc in Indonesia: Engaging the Pharmaceutical Industry and Private Providers*. Point-of-Use Water Disinfection and Zinc Treatment (POUZN) Project, AED, Washington, DC.

- Midwives in Bandung City and Bandung District, where midwives received POUZN training in addition to being exposed to the zinc mass media campaign, prescribed ORS/zinc at significantly higher rates (58%) than their counterparts in West Bandung (33%), where there was no intensive interpersonal POUZN intervention in addition to the zinc mass media campaign.

- The proportions of caregivers that gave ORS or ORS plus zinc to their child remained relatively constant baseline to end-line and ORS prescription by midwives was nearly universal in both areas.

- There was no significant change in use of antibiotics by caregivers. However, antibiotic prescription rates by midwives were much lower in the intensive intervention area of Bandung City/District (8%) compared to West Bandung (22%).

Zinc Knowledge and Awareness

- The percentage of randomly selected caregivers who know that zinc is effective for treating diarrhea increased from 2 percent at baseline to 22 percent at end-line. At end-line, caregivers in Bandung City and Bandung District heard messages about zinc at significantly higher rates than those in West Bandung.

- Significantly more midwives in Bandung City/District than in West Bandung said that they have been informed about the use of zinc for the treatment of diarrhea. Over 90 percent of midwives in Bandung City and Bandung District said that they were exposed to mass media messages, compared to 72 percent of midwives in West Bandung. Nearly all (99%) of midwives in Bandung City and Bandung District said that they were informed about zinc through interpersonal communication, compared to 80 percent of their counterparts in West Bandung.

Access to Zinc

- Nearly half of caregivers who treated childhood diarrhea with zinc said they obtained it from a *puskesmas* (community health center).

- Midwives in Bandung City and Bandung District cited a variety of public and private sources of supply for zinc, while an overwhelming majority of those in West Bandung cited the government as a source of supply.

Adherence to the Recommended Zinc Treatment Course of Ten Days

- Caregivers in West Bandung gave shorter than recommended dosage of zinc (five to nine days) at a significantly higher rate than caregivers in Bandung City and Bandung District.

- Nearly all midwives in Bandung City and Bandung District (97%) indicated that zinc is to be taken for ten days, compared to 85 percent of midwives in West Bandung.

The results suggest that the national mass media campaign succeeded in affecting unaided recall of messages that zinc is an effective treatment of diarrhea to roughly 20 percent of caregivers of children who have recently suffered a bout of diarrhea. It also suggests that it met its benchmark of a 20 percent zinc prescription rate among midwives.

Training of health care providers in addition to exposure to mass media holds promise for future efforts. Mutually reinforcing messages received from partners in conjunction with mass media are more likely to increase awareness/knowledge and affect behavioral change than the use of mass media alone. Nevertheless, since zinc is a new product that was just launched, USAID should continue its efforts to promote its use so that it becomes a universally accepted treatment for current and future episodes of childhood diarrhea.

I. Introduction

The World Health Organization (WHO) estimates that up to 2 million children under the age of 5 die each year from diarrhea. In 2004, WHO and UNICEF issued a joint statement that low-osmolarity oral rehydration salts (ORS) and zinc taken together is an effective approach to managing childhood diarrhea. ORS/zinc has been shown in clinical trials to reduce both the severity and the duration of diarrhea when zinc supplements are taken for 10 to 14 days.[2]

[2] Harvey, P. (2005): "Cost-effectiveness of zinc supplementation as an adjunct treatment for childhood diarrhea." Submitted to USAID. The USAID Micronutrient Program (MOST): Arlington, VA. Retrieved from: http://www.mostproject.org/ZINC/Zinc_Updates_Apr05/costeffectivenesszinc.pdf

Toward this end, the Point-Of-Use Water Disinfection and Zinc Treatment (POUZN) project, a USAID Private Sector Program (PSP) initiative co-managed by AED, supports the introduction of zinc treatment in conjunction with oral rehydration therapy (ORT)/oral rehydration salts (ORS) for diarrheal reduction. The ultimate goal of the project is to promote the long-term sustainability of ORT/ORS with zinc treatment by expanding commercial production, product availability, sales, and use of zinc products in three targeted countries—India, Tanzania, and Indonesia—over a five-year project lifespan. POUZN was designed to engage the private sector in the development, marketing, sale, and local acceptance of zinc treatment for diarrheal episodes.

In Indonesia, POUZN helped to introduce zinc as a new product for the treatment of diarrhea in children under 5 years of age. The project partnered with the pharmaceutical industry to ensure supply and demand in both public and private sectors. The zinc manufacturers launched their zinc brands and targeted pediatricians and general practitioners implementing a Cascade of Influence strategy.[3] In parallel, the Ministry of Health (MOH) introduced zinc treatment in the public sector. POUZN also reached out to midwives in the intensive intervention regions of Bandung City and Bandung District, and to caregivers through a nationwide television campaign and radio campaign in Java.

This evaluation briefing reports on the results of POUZN's work in Indonesia. Here, we assess the efficacy of an intervention designed to reach Indonesian providers and caregivers in a couple of ways: first, through midwife training using a Public-Private Partnership (PPP) model in Bandung City and Bandung District; and second, through a public mass media campaign across the country.

[3] A model used by pharmaceutical companies for new product launches to reach out to opinion leaders so that their influence cascades down to consumers. In this case, the cascade of influence flows from opinion leaders, to pediatricians, to general practitioners, to drug sellers, to nurses/midwives, and finally, to the general public/caregivers.

II. PROGRAM CONTEXT

Diarrhea is a leading cause of childhood mortality in Indonesia. According to the World Health Organization, diarrhea accounts for about 18 percent of deaths among Indonesian children under the age of 5.[4] The Indonesia Demographic and Health Survey 2007 found that 14 percent of children under age 5 were reported to have had diarrhea in the two weeks prior to the survey, and caregivers sought treatment through a health care provider in 51 percent of these cases. Even though over 90 percent of caregivers stated that they knew about ORS packets, only 35 percent of children with diarrhea were treated with ORS (or a prepackaged liquid). Sixty-one percent were given oral rehydration therapy (ORS, recommended home fluids, or simply more fluids than usual). Forty-eight percent of children with diarrhea were treated with syrup or pills, while 14 percent were given a home remedy or other treatment. Seventeen percent of children with diarrhea did not receive any treatment at all.[5]

III. PROGRAM GOALS

In Indonesia, POUZN sought to achieve two goals:

- Introduce zinc with ORS/ORT as the standard treatment for childhood diarrhea on a national scale, with emphasis on coverage by both the private and public sectors.
- Ensure an adequate supply of the zinc product, create demand and changes in prescription behaviors by providers, and support an enabling environment.

[4] "POUZN Indonesia: Private and Public Sector Collaboration to Improve Diarrhea Treatment," AED. Retrieved from http://www.psp-one.org on Sept. 8, 2010.
[5] Statistics Indonesia (Badan Pusat Statistik—BPS) and Macro International. 2008. *Indonesia Demographic and Health Survey 2007*. Calverton, Maryland, USA: BPS and Macro International.

POUZN worked to raise knowledge and awareness of the benefits of zinc for the treatment of diarrhea in children under 5 through training for midwives, to address caregiver demand indirectly, as well as through a mass media campaign to address caregiver demand directly.

IV. PROGRAM IMPLEMENTATION

In Indonesia, POUZN partnered with the Ministry of Health (MOH), the pharmaceutical industry, professional associations, and nongovernmental organizations (NGOs) to introduce zinc nationwide, as well as increase knowledge and awareness of the benefits of zinc for the treatment of diarrhea in children under 5. It adopted a pharmaceutical marketing model for new product launches the Cascade of Influence, starting with opinion leaders, pediatricians, general practitioners, pharmacists, and midwives. In order to accelerate the cascade strategy and reach the first-line providers, POUZN initiated a demonstration intervention to both midwives and community health workers (*Kaders*) in Bandung City and Bandung District in West Java.

In Bandung, where POUZN concentrated its efforts through a two-pronged approach, the prevalence of childhood diarrhea (at 18 percent) is slightly higher than the country average of 14 percent. – *Indonesia Demographic and Health Survey 2007*.

POUZN also reached out to caregivers through social workers in community health centers in Bandung District through group training and educational sessions. In addition to the interpersonal outreach methods described above, POUZN launched a national mass media campaign in coordination with the MOH.

Health care practitioners, including pediatricians, general practitioners, and midwives, are important sources of health care delivery for diarrhea treatment; a component of the project targets the behaviors and uptake of midwives to prescribe zinc with ORS for diarrhea treatment for children under the age of 5. In many parts of the country, midwives are the frontline health care providers for children under the age of 5. A POUZN baseline study conducted in 2009 showed that the provider most consistently consulted for advice on childhood diarrhea was the midwife (31%), followed by *puskesmas* (community health centers) (16%), general practitioners (6%) and *posyandus* (integrated health services posts) (6%). As a result, POUZN collaborated with partners and commissioned local consultants to train about 600 midwives between July 2009 and May 2010 on the use of zinc and ORS for the treatment of diarrhea in Bandung City and Bandung District; this accounts for approximately 44 percent of registered midwives in these two areas.

In parallel, POUZN facilitated the stocking, distribution, and the follow up promotion of zinc by the zinc companies.

Mass Media Campaign

A national mass media campaign, endorsed by the Ministry of Health, which ran from May 17 through June 30, 2010, served as the primary means of communicating directly to caregivers.

Interpersonal Communication

Beginning in July 2009, POUZN collaborated with the midwives professional association, the District Health Office, a marketing company and the zinc producers in Bandung City and Bandung District to train midwives on the importance of zinc in conjunction with ORS for the treatment of childhood diarrhea. POUZN also hired and trained a professional marketing firm to detail drug stores and midwives in Bandung City and Bandung District.

Implementation Timeline At-a-Glance

2006	
September	International zinc task force meeting with government officials
2007	
March	Zinc assessment team makes recommendations to the Indonesian government
May	POUZN initiates program activities in Indonesia
June-September	Government adoption of zinc treatment
July	Fast-track registration of zinc products with the Indonesian government
December	Kimia Farma launches generic zinc product
2008	
February	Indo Farma launches zinc product
July	Official launch of zinc at the Pediatric Congress (KONIKA)
October	Ministry of Health procures zinc
2009	
March	Bandung pilot initiated
February-March	Baseline survey of caregivers at the household level conducted
July	Midwives targeted for training based on Cascade of Influence model
2010	
April	Survey of midwives
May	Public mass media campaign launched across the country
July	Eight zinc brands are on the market
August	End-line survey of caregivers at the household level conducted

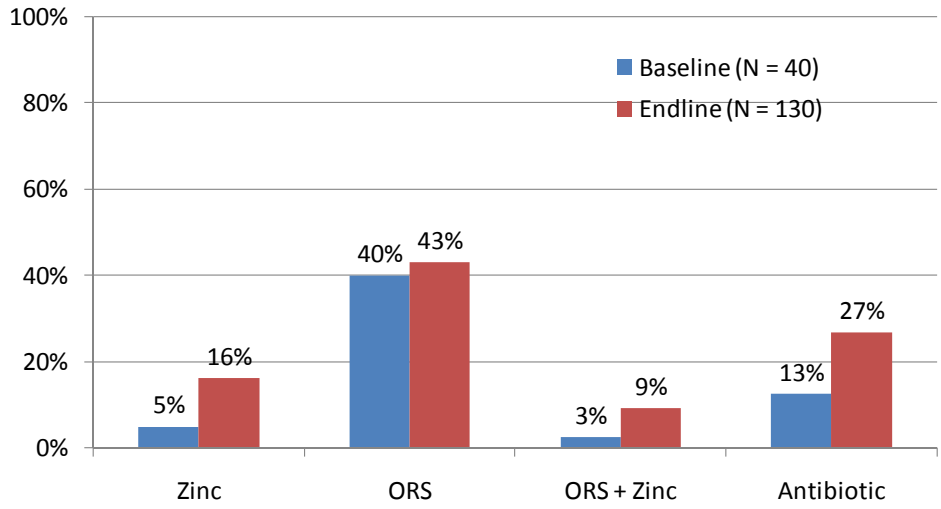
V. Program Outcomes

To assess program activities, POUZN fielded a pre-post survey of caregivers and a cross-sectional survey of midwives. A pre-implementation baseline survey was conducted with 506 randomly selected caregivers between February 20 and March 13, 2009. A post-implementation end-line survey was conducted with 820 randomly selected caregivers between July 28 and August 24, 2010. This random sample was augmented with a booster sample in which caregivers with children who had diarrhea in the last two weeks were oversampled. A total of 1,226 caregivers were interviewed. POUZN also conducted a survey with a random sample of 266 midwives who attended POUZN trainings in Bandung City and Bandung District. The same in-person paper interviews were conducted with a random sample of 199 midwives in West Bandung District to compare differences in zinc awareness, knowledge, and practice when messages are conveyed both in person and via mass media, versus mass media alone. The fielding period ran from June 1 to June 13, 2010.

Diarrheal Treatment Prescription and Usage

The percentage of randomly selected caregivers who said that they gave zinc to their child who had diarrhea in the past two weeks increased from 5 percent at baseline to 16 percent at end-line; however this change was not statistically significant (Figure 1). The proportions of caregivers that gave ORS or ORS plus zinc to their child remained relatively constant baseline to end-line. On the other hand, though antibiotic treatments seem to have gone up from 13 percent to 27 percent, this difference was not significant.

FIGURE 1: DIARRHEA TREATMENT CHANGES FROM BASELINE TO END-LINE



Base: Caregivers from the random samples who had a child suffering from diarrhea in the past two weeks.
*Statistically significant: * p <= 0.05; ** p <= 0.01; *** p <=0.001*

Augmenting the random end-line sample with an oversampled population of caregivers with children who suffered from diarrhea in the past two weeks enabled a comparison of caregiver usage trends between Bandung City and Bandung District, where mass media efforts were supplemented with provider training on zinc as well as some community outreach efforts, and West Bandung, a comparable neighboring area where no targeted interpersonal communication was implemented. Zinc use was slightly higher in Bandung City and Bandung District, but this difference was not statistically significant. Comparison figures are shown in Table 1 below.

TABLE 1: ORS/ZINC USE FOR THE TREATMENT OF CHILDHOOD DIARRHEA

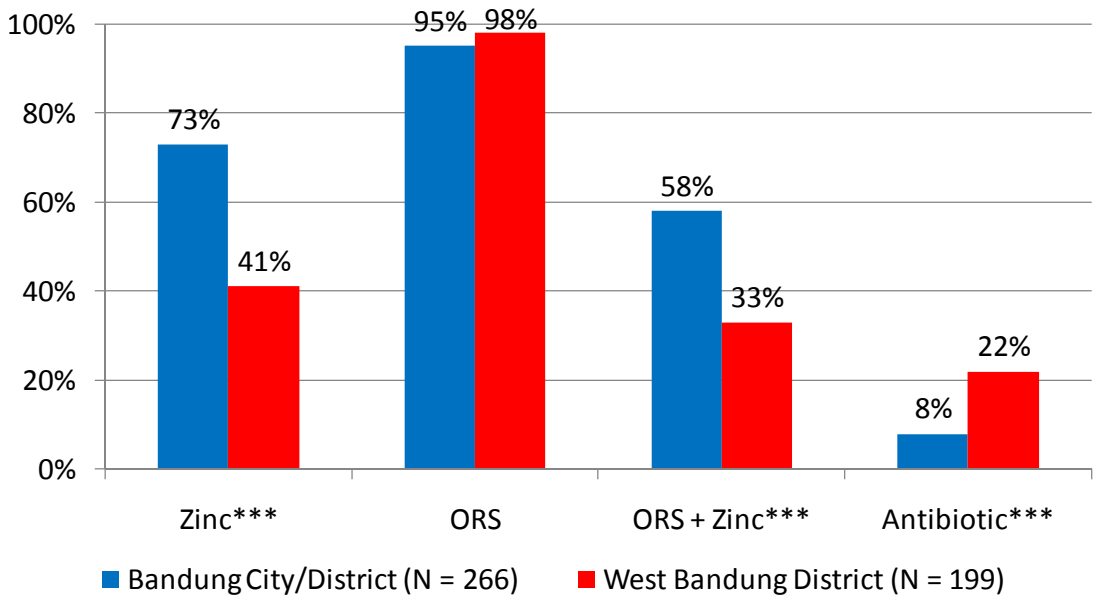
	% Caregivers	
	Bandung City/District	West Bandung
Treated with zinc	27%	21%
Treated with ORS	48%	49%
Treated with zinc plus ORS	16%	13%
Total number of caregivers	340	80

Base: Caregivers from the random and booster sample combined who gave medicine to a child suffering from diarrhea in the past two weeks.

*Statistically significant: * p <= 0.05; ** p <= 0.01; *** p <=0.001*

Midwives in Bandung City and Bandung District prescribed zinc at significantly higher rates than their counterparts in West Bandung (Figure 2). When asked which treatments they prescribed for the last case of diarrhea in a child under five years of age they saw, midwives in Bandung City/District prescribed zinc (73% v. 41%) and ORS with Zinc (58% v. 33%) at higher rates than their counterparts in West Bandung. In addition, nearly 8 out of 10 midwives (79%) in Bandung City and Bandung District said that they generally give zinc to children under the age of 5 with diarrhea, compared to 6 out of 10 (60%) in West Bandung. ORS prescription was nearly universal in both areas. Finally, antibiotic prescription rates were much lower in the intensive intervention area of Bandung City and Bandung District; nearly one quarter (22%) of the midwives from West Bandung said, unprompted, that they gave antibiotic to the last case of diarrhea, compared to 8 percent of their counterparts in Bandung City and Bandung District.

FIGURE 2: ZINC PRESCRIPTION PATTERNS AMONG MIDWIVES FOR LAST CASE OF DIARRHEA

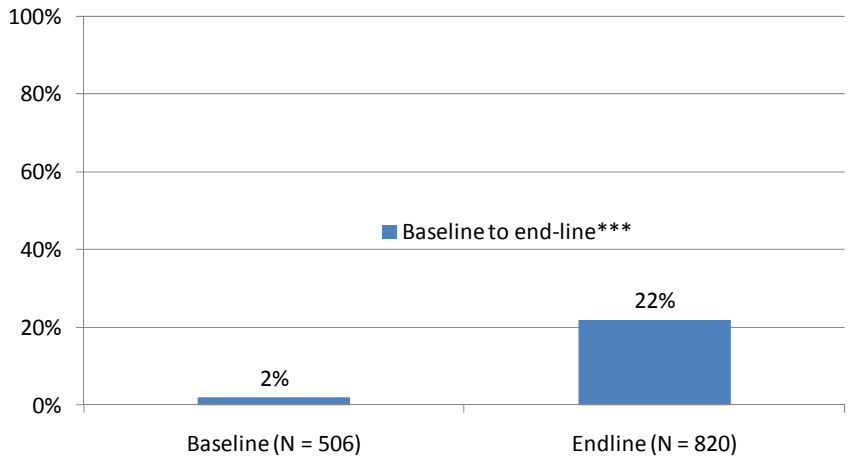


Base: All midwives.
*Statistically significant: * p <= 0.05; ** p <= 0.01; *** p <=0.001*

KNOWLEDGE AND AWARENESS OF ZINC FOR THE TREATMENT OF CHILDHOOD DIARRHEA

Over one in five caregivers (22%) know that zinc is effective for treating diarrhea, up from 2 percent at baseline (Figure3).

FIGURE 3: ZINC IS EFFECTIVE FOR TREATING DIARRHEA

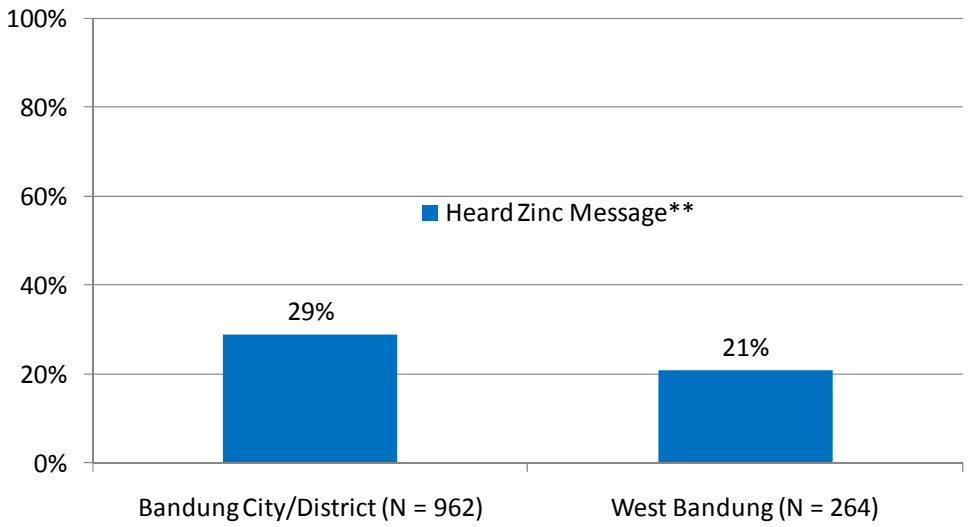


Base: All randomly selected caregivers
*Statistically significant: * p <= 0.05; ** p <= 0.01; *** p <=0.001*

According to the sample of randomly and purposively selected caregivers in Bandung City and Bandung District, these heard such messages at significantly higher rates than those in West Bandung (Figure 4). There was a very strong association between those who heard zinc messages and used zinc among those who gave medicine to a sick child in the last two weeks ($r = 0.654$; $p < 0.001$).[6]

[6] Pearsons R

FIGURE 4: HEARD MESSAGE ABOUT ZINC FOR THE TREATMENT OF DIARRHEA, BY REGION



Base: Caregivers from random and booster samples combined .
*Statistically significant: * p <= 0.05; ** p <= 0.01; *** p <=0.001*

Of the caregivers who heard messages about zinc for the treatment of diarrhea, nearly three-quarters (74%) said they heard through mass media and 65 percent said they heard through interpersonal communication. Mass media includes radio, television, newspapers, and banners/posters. Interpersonal communications include education sessions, community sales agents, village health talks, clinic health talks/nurses, doctors, friends, neighbors, relatives, health care workers, pharmacists, midwives, and outreach volunteers. Although both types of communication venues were significantly associated with zinc use among those who gave medicine to a child sick with diarrhea in last two weeks, interpersonal communication was more strongly associated with use ($r = 0.764$; $p < 0.001$ versus $r = 0.343$; $p < 0.001$).

At the provider level, significantly more midwives in Bandung City and Bandung District (99%) than in West Bandung (89%) said that they have been informed about the use of zinc for the treatment of diarrhea. There was a moderate association between midwives who heard zinc messages and prescribed zinc in the last case of diarrhea consulted ($r = 0.254$; $p < 0.001$).

Although no significant differences exist between the percentages of midwives in the two intervention areas who heard about zinc through the mass media, significant differences were found between the groups in information obtained through posters, trainings, past experience, medical representatives, and professional associations (Table 3). Supporting this finding, there were significant associations between zinc prescription by midwives in the last case of diarrhea

and source of zinc message: trainings by POUZN and DHO ($r = 0.316$; $p < 0.001$), posters ($r = 0.258$; $p < 0.001$), doctors and medical representatives ($r = 0.245$; $p < 0.001$), mass media ($r = 0.207$; $p < 0.001$), and past experience ($r = 0.185$; $r < 0.001$). It should be noted that these association are not to infer causality.

TABLE 3: SOURCES OF INFORMATION ABOUT ZINC (MULTIPLE RESPONSES ALLOWED)

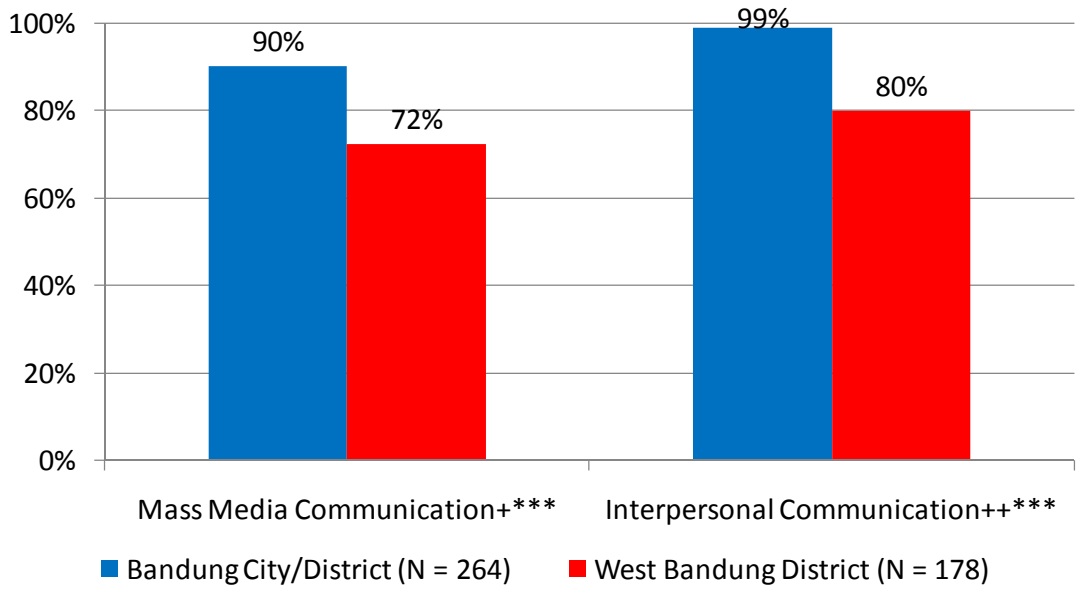
	Bandung City/District (N= 264)	***West Bandung District (N= 178)***
Mass Media (Radio/ TV/ Newspaper)	84.1	77.5
Posters***	89.8	67.4
Past experience**	42.1	28.7
Doctor (Private/ Government)*	78.4	69.1
Friends/ Relatives	75.0	71.9
POUZN Training* **	**78.4**	**18.5**
Medical Representatives* **	**41.7**	**20.2**
Books/ Journals***	64.8	37.6
Training by DHO/ Organization (IDAI/ IBI)* **	**88.6**	**43.3**
Other	12.5	15.2

Base: Midwives who have heard about zinc.
*Statistically significant: * p <= 0.05; ** p <= 0.01; *** p <=0.001*

The most commonly heard messages about zinc regarding diarrhea treatment among midwives include:

- ✓ It prevents the occurrence of diarrhea for a longer duration (63%)
- ✓ It reduces future incidences of diarrhea (64%).

FIGURE 4: EXPOSURE TO MASS MEDIA VS. INTERPERSONAL COMMUNICATION, BY LOCALE



Base: Midwives who have heard about zinc
Statistically significant: * p <= 0.05; ** p <= 0.01; *** p <=0.001
+ Newspaper/ Books/ Broadcast Media
++ Doctors/ POUZN Training/ Medical Reps/ DHO Training

ACCESS TO ZINC

About half of all caregivers who gave zinc obtained it from a *puskesmas* (community health center). There are no significant differences between Bandung City/District and West Bandung.

TABLE 4: WHERE CAREGIVERS OBTAINED ZINC

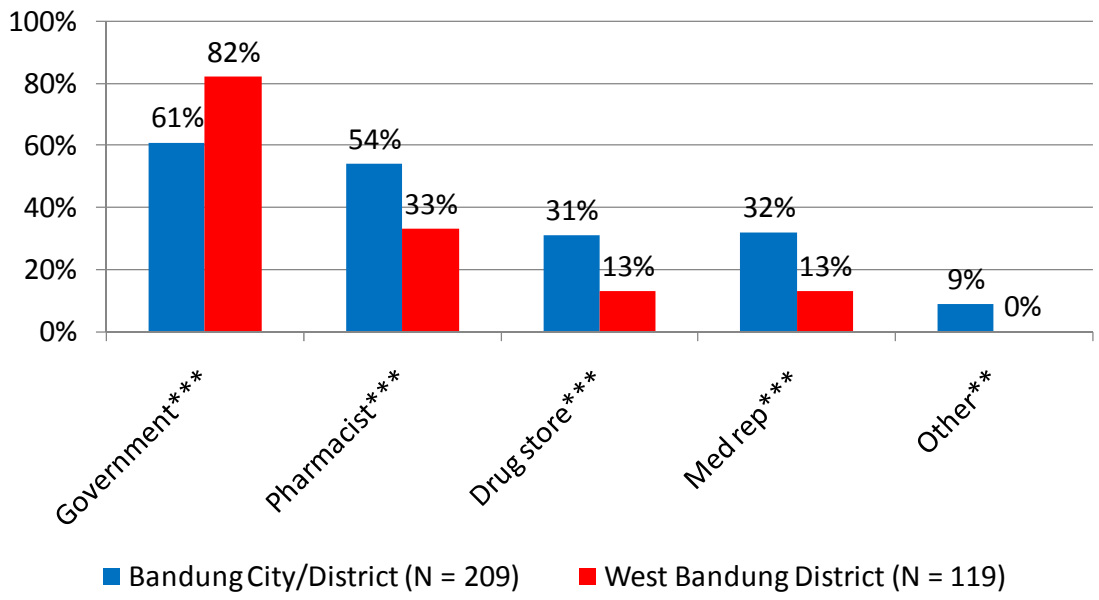
	% Caregivers	
	Bandung City/District	West Bandung
Hospital	15%	12%
Clinic	3%	6%
Puskesmas (Community Health Centers)	55%	47%
Posyandus (Community Health Posts)	7%	6%
General Practitioner	6%	6%
Pediatrician	10%	6%
Mantri (Auxiliary Midwife)	1%	0%

	% Caregivers	
	Bandung City/District	West Bandung
Midwife	11%	29%
Apotek (Pharmacy)	12%	12%
Toko Obat (Drugstore)	1%	0%
Total number of caregivers	91	17

Base: Random plus booster samples of caregivers who treated childhood diarrhea with zinc
Statistically significant: * p <= 0.05; ** p <= 0.01; *** p <=0.001

At the provider level, reports of where zinc is available varied significantly by area. Midwives in Bandung City and Bandung District cite several public and private sector sources of zinc supply, while an overwhelming majority of midwives in West Bandung cited the government as the main source of supply for zinc.

FIGURE 5: ZINC AVAILABILITY BY SOURCE, AS REPORTED BY MIDWIVES

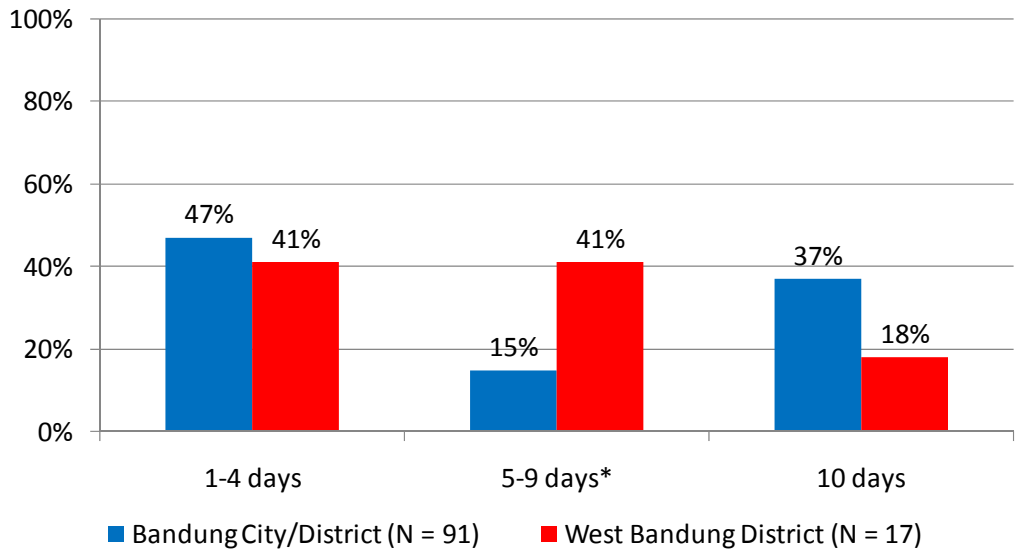


Base: Midwives who recommended zinc.
*Statistically Significant: * p <= 0.05; ** p <= 0.01; *** p <=0.001*

ADHERENCE TO RECOMMENDED TREATMENT COURSE OF TEN DAYS

Caregivers in Bandung City and Bandung District were more likely to give zinc for the full recommended course of 10 days (37%) than their peers in West Bandung (18%); however, most likely due to small sample size, this difference was not statistically significant. On the other hand, significantly more caregivers in West Bandung (41%) gave zinc to their child for five to nine days compared to caregivers in Bandung City and Bandung District.

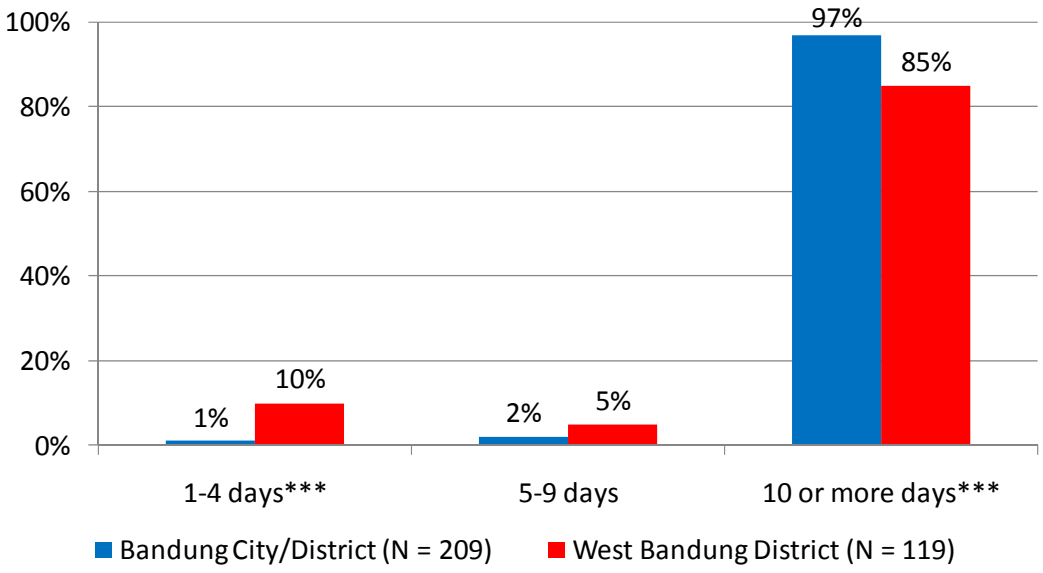
FIGURE 6: NUMBER OF DAYS CAREGIVER GAVE ZINC TO CHILD



Base: Caregivers from the random and booster samples combined at end-line who gave child a zinc product for the treatment of diarrhea.
*Statistically Significant: * p <= 0.05; ** p <= 0.01; *** p <=0.001*

Of the midwives who prescribed zinc, nearly all those in Bandung City and Bandung District (97%) indicated to caregivers that it is to be taken for ten days or more, compared to 85 percent of those in West Bandung. These differences were statistically significant.

FIGURE 7: NUMBER OF DAYS FOR WHICH ZINC IS TO BE TAKEN, AS TOLD TO CAREGIVERS BY MIDWIVES



Base: Respondents who recommended zinc.
*Statistically Significant: * p <= 0.05; ** p <= 0.01; *** p <=0.001*

VI. CONCLUSIONS AND IMPLICATIONS

In this section, we provide key highlights from the findings of this evaluation and implications for practice to help improve the existing intervention, as well as to serve as important input for stronger implementation of similar programs in the future.

INCREASED ZINC PRESCRIPTION AND USAGE RATES

- Caregiver zinc usage levels increased from baseline to end-line. Caregivers who reside in locales where mass media messages promoting zinc were complemented by training to healthcare providers used zinc at higher rates than those who reside in an area that was only exposed to mass media messages.
- Midwives in areas where POUZN provided training in addition to being exposed to the zinc mass media campaign, prescribed ORS/zinc or zinc alone at significantly higher rates than their counterparts in an area where there was no training in addition to the zinc mass media campaign.

Implications: Convey mutually reinforcing messages in a variety of ways through a mix of communication channels to ensure increased uptake.

INCREASED ZINC KNOWLEDGE AND AWARENESS

- Caregiver knowledge that zinc is effective for treating diarrhea increased 20 percentage points from baseline to end-line. Caregivers in areas where health care providers received additional training heard such messages at significantly higher rates than those where no such training was provided.
- Significantly more midwives in areas where POUZN conducted trainings and follow-up detailing state that they know about the use of zinc for the treatment of diarrhea than their counterparts in areas where providers were targeted with messages about the use of zinc for the treatment of diarrhea through mass media communication alone.

Implications: Influencing health care service professionals in the community can increase knowledge and behavior change among both providers and caregivers.

Increased Access to Zinc

- Caregivers who treated childhood diarrhea with zinc said they obtained it mostly from a community health center.
- Midwives in areas where POUZN training was provided cited a variety of public and private sources of supply for zinc, while an overwhelming majority of their counterparts elsewhere cited the government only as a source of supply.

Implications: Providers need to be fully informed about where zinc is available and to convey this information reliably and completely to caregivers.

Adherence to the Recommended Zinc Treatment Course of Ten Days

- Nearly all midwives in areas where POUZN provided training indicated to caregivers that zinc is to be taken for 10 days or more, compared to somewhat fewer midwives in areas served by a mass media campaign alone.
- Caregivers in locales where health care providers were trained gave the correct dosage of zinc more often than counterparts in areas serviced by a mass media campaign alone. However even in the more intensive intervention area, less than half of caregivers gave zinc for the full ten days.

Implications: Additional studies to understand why many caregivers do not want to give zinc for the full 10 days needs to be explored.

In conclusion, USAID should continue its efforts to promote the use of zinc so that it becomes a universally accepted treatment for current and future episodes of childhood diarrhea.