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through the Private Sector

Diarrhea Management and the Medicine Seller-Customer Transaction



BRIEF

Summary: This brief presents results from a qualitative study on factors that influence and perpetuate gaps between knowledge and practice among community-level medicine sellers. The SHOPS project trained medicine sellers in new diarrhea management protocols, and explored how the dynamics between these medicine sellers and their customers shaped transactional outcomes. While medicine sellers often act as first-line medical providers, they lack the status of clinicians and are motivated to maintain their customer base, which leads to a power imbalance that favors customer requests and diminishes opportunities for educational interaction. The findings suggest that behavior change efforts targeted at both providers and consumers should incorporate components that consider the dynamics between medicine sellers and customers.

Keywords: child health, Ghana, diarrhea management, oral rehydration salts, zinc

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Project Description: The Strengthening Health Outcomes through the Private Sector (SHOPS) project is USAID's flagship initiative in private sector health. SHOPS focuses on increasing availability, improving quality, and expanding coverage of essential health products and services in family planning and reproductive health, maternal and child health, HIV and AIDS, and other health areas through the private sector. Abt Associates leads the SHOPS team, which includes five partners: Banyan Global, Jhpiego, Marie Stopes International, Monitor Group, and O'Hanlon Health Consulting.

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Diarrhea Management and the Medicine Seller-Customer Transaction

More than 1,600 children die each day as a result of diarrhea and dehydration. Excluding neonatal deaths, diarrhea is the second-leading killer of children under age 5 (Liu et al., 2015). In May 2004, the World Health Organization (WHO) and UNICEF issued a joint statement on the clinical management of acute pediatric diarrheas, which advised the use of a low-osmolarity formulation of oral rehydration salts (ORS), with lower levels of glucose and sodium to better address dehydration, and a 10- to 14-day course of zinc. Zinc is an essential micronutrient proven to reduce the severity of a diarrhea episode and, if taken for a full 10- to 14-day course, can reduce the risk of further episodes in the following 2 to 3 months (Bahl et al., 2001; Bhutta et al., 1999).

In the 10 years since the WHO/UNICEF statement was issued, many developing countries adopted the guidelines as national policy and worked through global programs to introduce zinc and promote its use alongside ORS (the recommended treatment for decades) as a treatment for acute pediatric diarrhea. The private sector is particularly well-positioned to assist with this effort for two reasons:

- Private providers, particularly those operating in Asia and Africa, are a major source of care for childhood diarrhea (Montagu and Visconti, 2010).
- Private retailers can play an important role in providing ORS and zinc, because the treatments are available over the counter in most countries.

A persistent obstacle to the management of acute diarrhea has been the widespread recommendation of inappropriate treatments by health providers, sometimes in conjunction with ORS and zinc. These include antidiarrheals, which should never be given to children and, more prevalently, antibiotics, which should be used only in the presence of bloody diarrhea or shigellosis. This has been particularly true of private sector providers, who recommend antibiotics at a higher rate than their



Medicine sellers are a major source of treatment for childhood illnesses, including diarrhea—a leading cause of death.

public sector counterparts (Sood and Wagner, 2014). Given the prominence of the private sector in diarrhea treatment, global programs have focused on supporting and improving private provider compliance with recommended protocols.

In 2011, the USAID-funded Strengthening Health Outcomes through the Private Sector (SHOPS) project initiated its flagship diarrhea management program in three regions of Ghana (Greater Accra, Central, and Western) to introduce zinc and promote its use with ORS through private sector channels. The program specifically targeted over-the-counter medicine sellers, who are a major source of diarrhea treatment in the country and yet are overlooked by public sector training programs.

SHOPS partnered with the Pharmacy Council of Ghana to host half-day trainings for more than 2,000 medicine sellers in the three priority regions during its annual required training in 2012, with shorter refresher trainings each year thereafter. The council accredits, trains, and inspects all shops carrying pharmaceutical products.

In 2012, SHOPS conducted a randomized controlled trial to evaluate the impact of training coupled with mobile reminders on changing the diarrhea management practices of medicine sellers (Friedman et al., 2015). Provider surveys showed that the vast majority of medicine sellers said they did not dispense antibiotics and knew that ORS and zinc were the correct treatment for acute diarrhea.

However, a mystery client survey conducted as part of the study found that 55 percent of the providers incorrectly recommended or sold antibiotics or antidiarrheals. While a 2014 follow-up mystery client survey (Banke and Sanders, 2014) implemented by SHOPS showed reduced rates of antibiotic or antidiarrheal dispensing (45 percent) for acute pediatric diarrhea, more than half of medicine sellers surveyed were still not recommending ORS and zinc as a complete and standalone treatment. They were dispensing only zinc, only ORS, or a combination of zinc or ORS with an antibiotic or antidiarrheal.

Several studies reveal that discrepancies between practitioner knowledge and practice have been widely prevalent in a number of countries.

Medicine Sellers in Ghana

Medicine sellers operate privately owned drug shops licensed by the Ghana Pharmacy Council. By law, they are restricted to sell only over-the-counter drugs and are not permitted to sell antibiotics for internal use, with the exception of co-trimoxazole for the treatment of pneumonia. Shop *owners* must have at least a basic education certificate, pass a registration test, and attend annual training. Shop *assistants* are not required to meet these standards and primarily receive informal training on the job.

The knowledge-practice gap identified in Ghana is neither unique to the country nor to medicine sellers. A scan of the global literature reveals that discrepancies between practitioner knowledge and practice have been widely prevalent and documented in a number of countries, including Bangladesh, India, Indonesia, Kenya, Nigeria, and Peru (Wagner et al., 2015; Simpson et al., 2013; Zwisler et al., 2013; Larson et al., 2012; Paredes et al., 1996). Additional studies have generated several hypotheses on reasons behind the knowledge-practice gap, including consumer expectations and demands; provider knowledge and motivations, particularly related to generating profit; and social norms around the use of antibiotics, including the idea that there is less risk to both the client's health and the seller's professional image in selling antimicrobials than in recommending an alternative (Leonard and Masatu, 2010; Viberg et al., 2010; Goodman et al., 2007; Das and Hammer, 2005; Radyowijati and Hilbrand, 2002; Brugha and Zwi, 1998; Ofori-Adjei and Arhinful, 1996). Although research and data collection have done much to illuminate the variety of factors at play in dispensing decisions, there is a lack of information on how these factors come together to influence suboptimal outcomes, and few studies have focused directly on the mediating effect of interactions between medicine sellers and their customers.

METHODS

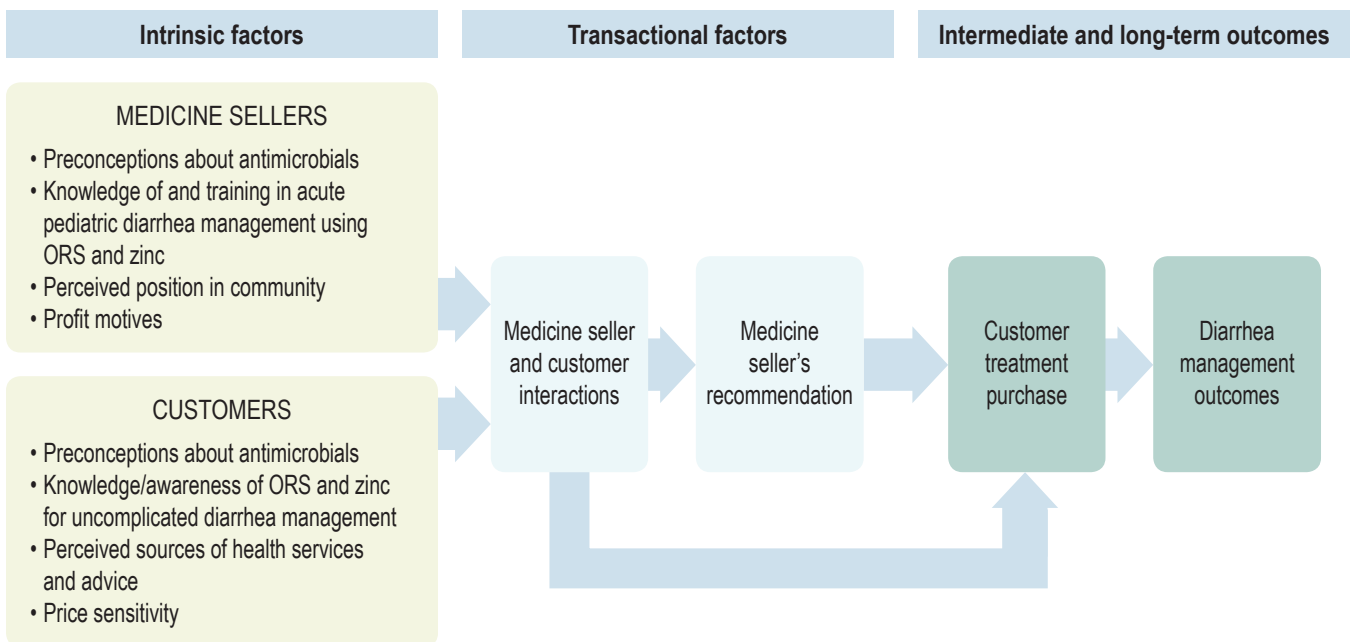
Previous research shows that a combination of factors, partially mediated through customer-seller interactions at the point of sale, may determine what kind of treatment a customer purchases (Figure 1). However, there is a need for better understanding of why and how medicine sellers continue to dispense suboptimal treatments for acute pediatric diarrhea despite knowledge to the contrary. As a result, SHOPS implemented a qualitative study that used focus groups to explore the ways in which medicine seller-customer interactions shape treatment outcomes.

To study why medicine sellers in Ghana continue to recommend and sell antimicrobials and antidiarrheals in addition to ORS and zinc to treat acute pediatric diarrhea, researchers conducted 26 focus group discussions with groups of 8 to 10 participants. Researchers conducted 17 focus group discussions with medicine sellers to engage them about their knowledge, practices, and interactions with customers. Nine focus group discussions were conducted with caregivers of young children who patronize medicine seller shops to explore the customer side of the transaction.

SHOPS explored provider knowledge-practice gaps through the lens of medicine seller-customer interactions.

The SHOPS randomized controlled trial and other research on provider practice (Leonard and Masatu, 2010) strongly indicate that directly asking medicine sellers about their practices might not yield truthful or wholly accurate information. To mitigate potential observer effects, researchers designed their focus group moderation approach to incorporate a group analysis of five descriptive dispensing scenarios (called vignettes), which looked at factors that the existing literature suggests play a role in dispensing alongside interaction dynamics. Researchers used carefully structured questions to explore the vignette and relate them to participants' experiences.

Figure 1. Factors that Determine Diarrhea Management Outcomes



Factors Studied Using Vignettes

- Whether the customer is the child's primary caregiver
- Amount of information the customer has about the diarrhea case he or she wants to treat
- Amount of information the medicine seller obtains from the customer before giving a recommendation or making a sale
- Nature of the customer's request (a direct request for medication versus a request for advice)
- Role that treatment prices play in a customer's decision



Findings



FINDINGS

Discussions with medicine sellers and customers revealed a behavioral pattern regarding a variety of medicine seller and customer interactions, inside and outside the context of diarrhea management. The findings were used to construct a conceptual model that explains the stages of dispensing treatments in a medicine shop context (Figure 2). This model separates a transaction between a medicine seller and a customer into five stages: initiation, engagement, education, negotiation, and outcome. The stages can lead to a dispensing outcome, which can be optimal (ORS and zinc with or without a referral to a higher level facility for further diagnosis) or suboptimal (something other than or in addition to ORS and zinc is dispensed).

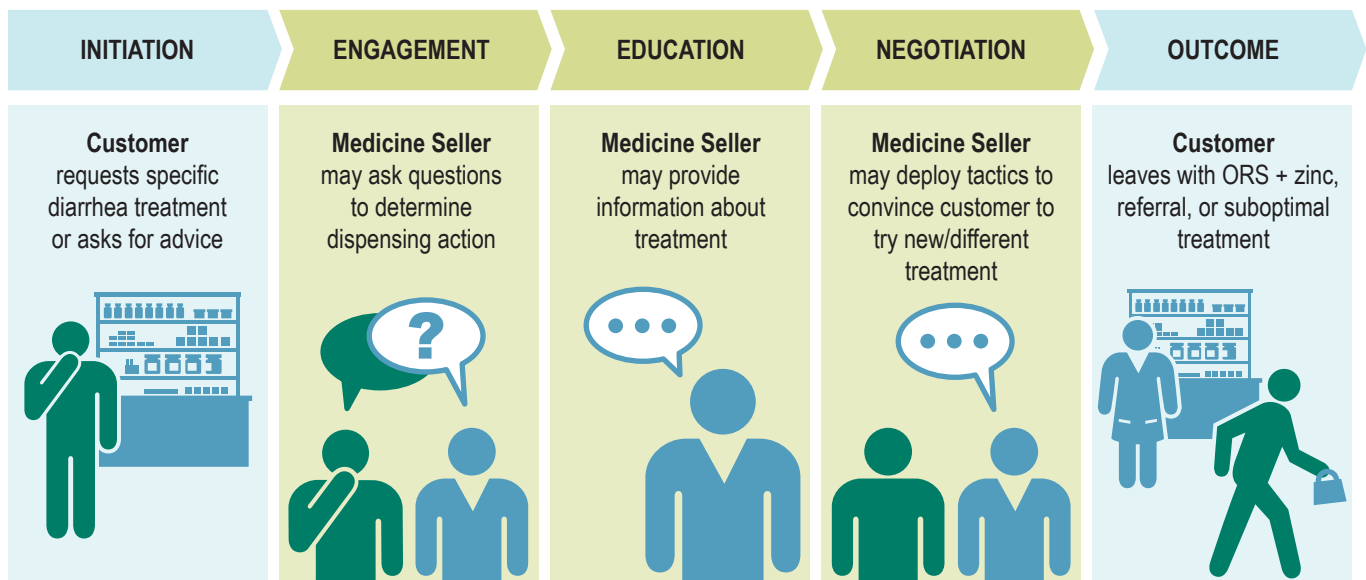
The transaction stages categorize the range of *potential* interactions between a medicine seller and a customer, but not all transactions will move through the stages. While all transactions begin with initiation and end with some sort of outcome, the engagement, education, and negotiation stages may or may not occur.

“A woman came [in] with a particular package, for example Flagyl (an antibiotic) . . . I went back to her to know why she was insisting on that particular drug. She said ‘That is what I have been using since the child was one year [old].’”

– Greater Accra medicine seller

Whether and how a transaction progresses through the stages depends on the power dynamic between a medicine seller and a customer. The power dynamic is influenced by a variety of medicine seller and customer factors: motivations, expectations, experience, and knowledge of appropriate treatment for diarrhea.

Figure 2. Customer-medicine seller transaction model





In the initiation stage, the customer requests a specific treatment or asks for advice.

Initiation

Transactions tend to begin with a customer in control of the interaction. A customer will initiate a transaction with a medicine seller in one of two ways: (1) he or she will make a direct, specific request for an optimal or a suboptimal treatment, or (2) he or she will make an indirect request for a treatment by first soliciting input or a recommendation from a medicine seller. Respondents in the study perceived specific requests as the most common way in which customers initiate transactions in drug shops. When customers request a specific diarrhea treatment, the power dynamic in the transaction immediately shifts in favor of the customer, who expects the medicine seller to, in the words of one Greater Accra customer, “[give] them what they want.” When customers make indirect requests or request advice, the power dynamic shifts in the medicine seller’s favor, as the customer is now dependent on the seller to help him or her make a decision.

Medicine sellers may be able shift the power dynamic and alter the outcome of a transaction if they are able to lead an interaction through some or all of the stages of engagement, education, and negotiation. But this depends on a medicine seller’s willingness and skill level.

“When a treatment I have given to my child is not working, the child’s condition not improving, and I don’t have time to take the child to the hospital . . . I will then go to the drug store owner for treatment advice and some medication.”

– *Western Region customer*

Engagement

Before they offer or sell a diarrhea treatment, medicine sellers explained that their primary responsibility is to get more information from a customer. During the SHOPS training in diarrhea management, medicine sellers learned that they should ask every customer diagnostic questions to assess the type and severity of the child's diarrhea, including the age of the child, duration of the diarrhea, whether and what treatment has already been given, and whether there is blood or mucus in the stool. Sellers also learned that they should assess the child for signs of dehydration. Medicine sellers typically engage in an insufficient level of questioning to determine an appropriate treatment, according to medicine sellers and customers. This finding is supported by previous SHOPS mystery client surveys.

“He asked what was wrong with my child and I explained to him that he is weak and vomiting and going to toilet at the same time . . . [Without asking anything else] he then gave me ORS and zinc tablet[s] to administer on the child.”

– Greater Accra customer



In the engagement stage, the medicine seller may ask questions to determine dispensing advice. Sellers should also assess the child for signs of dehydration.

When medicine sellers ask customers detailed questions, they assume a more “provider-like” role, which shifts the power dynamic in favor of the medicine sellers. The depth of a medicine seller’s questioning is highly dependent on the customer’s motivations, abilities and level of knowledge. Some medicine sellers explained that engagement could be difficult because customers may resist questioning or do not have enough information to be able to sufficiently answer questions.

However, diagnostic questioning gives medicine sellers more information to be able to advise and recommend treatments, as they learned in training. This is especially important when customers make a direct request for an inappropriate treatment. It is difficult for medicine sellers to demonstrate their knowledge and training, and make a convincing case for ORS and zinc, when they only engage in minimal questioning.

Education

Engaging a customer by asking questions, however minimally, opens the door for a medicine seller to *educate* customers about appropriate diarrhea treatments. In this stage, medicine sellers have the opportunity to introduce and promote the use of ORS and zinc over inappropriate treatments, which is important when the customer directly requests a treatment that is not optimal or appropriate. Most medicine sellers will provide their customers with *practical information* about the products they sell, including a description of a medication’s administration, dosage, or side effects. While this type of information may be perceived as good customer service, it preserves a power dynamic that favors the customer and does not create an



In the education stage, the medicine seller may provide information about the treatment.

opportunity for medicine sellers to inform or guide their customers about alternatives. In contrast, when medicine sellers provide *health education*, they draw on their knowledge and use their professional discretion to provide greater detail about the benefits of ORS and zinc and the drawbacks to inappropriate treatment. The extent to which a medicine seller is able to provide health education is highly dependent on how the interaction is initiated.

“It depends on the person—whether when she came, she told you, ‘I want this’ or ‘I want that,’ but if she says, ‘My child is having diarrhea. Which medicine do you think will be good for him or her?’ then you introduce her to [ORS and zinc].”

– Greater Accra medicine seller

Negotiation

After a medicine seller provides advice, a customer may request more information and then determines whether he or she will accept the medicine seller's advice. If so, the medicine seller may provide additional instruction (on treatment dosing or administration, for example) prior to completing the sale or making a referral. If the customer rejects or pushes back on the medicine seller's advice, some sellers will allow the customer to buy the requested treatment so that they do not lose a customer. Others will remain in control of the interaction by either refusing service to the customer (if the customer requested an inappropriate treatment) or, ideally, using a variety of negotiation tactics to shift the power dynamic and convince the customer to accept their advice. Across the focus group discussions, medicine sellers described several

strategies they used to convince customers to use ORS and zinc, such as appealing to customers' previous exposure to or experience with other sources of health information (the media, clinical providers) or offering financial incentives (discounts, free trials, or credit). Although these tactics vary, each approach medicine sellers use to convince is essentially, as a medicine seller in Greater Accra put it, "All a matter of going down to their [the customer's] level."

Outcome

Findings from focus groups with medicine sellers and customers reveal that the ability of medicine sellers to take control of an interaction and engage, educate, and negotiate optimal treatment of acute pediatric diarrhea with their customers can be undermined by four barriers.



In the negotiation stage, the medicine seller may deploy tactics to convince the customer to try a new or different treatment.



In the outcome stage, a customer leaves with ORS and zinc, a referral, or suboptimal treatment.

Barriers to optimal outcomes

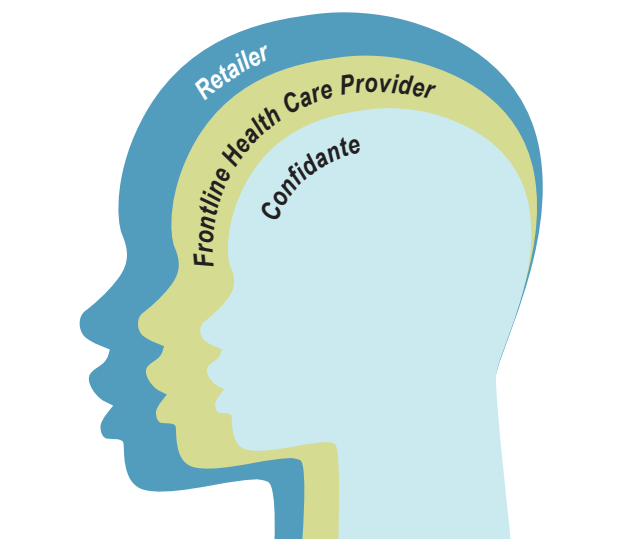
- Medicine sellers' overlapping and conflicting roles
- Perceptions of medicine sellers' status and credibility
- A lack of medicine sellers' knowledge
- Customers' preferences and practices

Medicine sellers have overlapping and conflicting roles.

One factor that complicates the ability of a medicine seller to engage and negotiate with clients is the complex nature of the medicine seller's role (Figure 3). Medicine sellers describe themselves as occupying two worlds at odds with one another. Unlike other community-based health workers, medicine sellers are first and foremost businesspeople who are compelled to compete by emphasizing customer service and are motivated to satisfy through the fulfillment of customer requests. At the same time, often by virtue of their physical location within the community compared to other providers, medicine sellers assume a role akin to a frontline health provider. Based on their unique positioning, several medicine sellers described an additional role of a confidante, in which

customers see medicine sellers as trustworthy and nonjudgmental sources for confidential and seemingly trivial matters. These roles are overlapping, sometimes conflicting, and fluid. During transactions with customers, the degree to which medicine sellers will assume additional roles beyond businesspeople is influenced by their own motivations as well as the expectations and perceptions of customers. Ultimately, the role (or roles) they assume influences their ability to take control of an interaction and steer it toward an optimal outcome.

Figure 3. Overlapping Roles of Medicine Sellers



This study shows that the desire to maintain and cultivate a strong customer base may motivate some medicine sellers to dispense certain treatments over others. Previous literature indicated that profit margins were the motivation.

Customers see a medicine seller as a “doctor in the community” but not a doctor.

Customers agreed that their expectations for medicine sellers were different than their expectations for clinical providers, whether public or private. Some customers saw medicine sellers as accessible, affordable, and approachable sources for basic health advice and treatment. Others thought they lacked the stature and built-in credibility that comes with a higher level of education and formal training. Customers have more control over the outcome of a transaction with a medicine seller versus a private clinical provider, because medicine sellers must cultivate a customer base to maintain their businesses without the stature of a clinical provider. This was summarized by one medicine seller:

“What happens is that they [customers] believe that the doctors are more learned than the medicine seller and also, when you are sick and you go to the hospital, you don’t see drugs lined up in the doctor’s office, so what the doctor says is final. But at the drug store they see a whole lot of drugs lined up and so they end up challenging what the medicine seller says.”

— *Western Region medicine seller*

Medicine sellers have superficial knowledge of pediatric diarrhea.

Although medicine sellers frequently referenced that the recommended treatment for acute pediatric diarrhea was ORS and zinc, and that they should not be selling or recommending antibiotics, few medicine sellers were able to fully explain *why* adding ORS and zinc was effective in treating pediatric diarrhea, and why antibiotics were not. Medicine sellers’ superficial understanding about how and why ORS and zinc work to treat acute pediatric diarrhea may cause some to inadvertently give the impression that ORS and zinc are palliative or supplemental therapies that are not powerful enough to address the root cause of the diarrhea.

This poor knowledge weakens the ability of medicine sellers to successfully negotiate with customers who have a poor understanding of the causes of pediatric diarrhea and the role of ORS and zinc.

Zinc is a hard sell in a market with strong customer loyalty to antibiotics.

Customer participants revealed a deep loyalty to antibiotics, especially if it is perceived to stop diarrhea quickly. Customers’ faith in antibiotics increased if it was previously recommended by a doctor to treat diarrhea. They used these endorsements to justify ongoing self-prescription of antibiotics for subsequent cases of diarrhea, even if they lack specific diagnostic indicators, such as blood in the stool. These findings support literature that has found that inappropriate use of antibiotics in Ghana is pervasive and difficult to change (Gyansa-Lutterodt, 2013; Donkor et al., 2012; and Vialle-Valentin et al., 2012).

Within this environment, introducing zinc to treat diarrhea is challenging. One of the main obstacles to the sale and use of zinc is its novelty. Both medicine sellers and customers reported that there was a fear of the unknown among customers who have not tried zinc. In addition to the novelty of zinc, medicine sellers reported that their customers perceived zinc to be slow-acting compared to other treatments. There is a perception that it takes 10 days to stop the diarrhea, which is deemed unacceptable by customers who value a fast-acting diarrhea treatment above all else. Misperceptions of zinc combined with a market deeply loyal to antibiotics for the treatment of diarrhea make zinc a tough sell. A poor understanding of the causes of pediatric diarrhea and the role of zinc inhibits the ability of medicine sellers to establish credibility as frontline health providers and to steer their customers toward an appropriate treatment.

“If you give [the customer] zinc and ORS, they will ask ‘Is that all? My child is about to die; is that all that you can give me?’ I tell them it will work, [but] they will leave with sadness and disappointment as if you do not know what you are about . . . They were expecting something more expensive and strong.”

— *Greater Accra medicine seller*

Conclusion and Recommendations



CONCLUSION AND RECOMMENDATIONS

In 2014, UNICEF, country partners, and other donors came together to commit to ending preventable child and maternal deaths by 2035. Medicine sellers are at the forefront of this global battle against childhood mortality, since they are a major source of treatment for childhood illnesses. Understanding barriers that impede a medicine seller's ability to successfully engage, educate, and negotiate with customers and ultimately encourage the expanded use of ORS and zinc is therefore vital to both global objectives and the lives of millions of children. SHOPS researchers identified the following recommendations for global programs that aim to influence the practices of medicine sellers.

Revise training programs to strengthen knowledge about diarrhea treatment and incorporate customer engagement strategies.

Training interventions for medicine sellers need to be revised to account for these providers' unique role and the contextual realities they face. It is important that future training efforts provide medicine sellers with a deeper understanding of ORS and zinc treatment that includes discussion of the causes of acute pediatric diarrhea, the mechanisms through which ORS and zinc work to stop diarrhea and protect against future episodes, and why antibiotics (as well as antidiarrheals) are not indicated for treatment of most pediatric diarrhea. Training should include specific sales pitches and negotiation strategies that they can use to engage, educate, and negotiate with various types of customers. In the focus groups, several medicine sellers described negotiation techniques that they have used successfully to convince customers to try ORS and zinc—techniques that provide useful insight to guide the design of training curriculums. Highlighting best practices through role play, dramatic presentations of successful negotiations, or group discussion of medicine sellers' own experience may be particularly useful approaches to this type of training because they promote two important strategies: eliciting techniques that medicine sellers are already using in their shops and providing the opportunity for practice.

Position medicine sellers as credible, trained sources of pediatric diarrhea treatment and advice.

Customers do not uniformly trust medicine sellers to provide them with health care advice, especially in contexts where this advice differs from what higher-level health care providers advised in the past. A global literature review found that improvements in the behavior of informal providers were observed after measures to enhance their legitimacy were implemented (Belenky, 2014). Promotional efforts that endorse the medicine sellers as trained and credible sources of diarrhea treatment and advice among their customers should be implemented along with improvements in training. Below are strategies that could support such efforts.

- Following training sessions, distribute certificates to medicine sellers to display in their shops, providing customers with visual confirmation that the medicine seller is trained to advise and treat acute pediatric diarrhea.
- In mass media promotional marketing for ORS and zinc, depict medicine sellers as a part of the health care provider continuum and emphasize that they should be consulted about diarrhea treatment.
- Work through interpersonal channels, particularly community leaders and mothers' groups, to endorse the diarrhea management expertise of medicine sellers.

Improve marketing and promotion of ORS and zinc as a combined, standalone treatment.

Although awareness of ORS and zinc is robust, widespread themes of confusion, reluctance, and misinformation in both medicine seller and customer focus groups reveal a need to reevaluate zinc promotion and positioning in national marketing and messaging campaigns, which would influence sales pitches that medicine sellers use to convince their customers. Messaging around zinc should emphasize the following themes:

- Diarrhea in children is different from diarrhea in adults. It is often caused by a viral infection. Zinc is the only treatment that will boost the body's immune response to a viral infection.

- Antibiotics do not work to fight illnesses caused by a virus.
- ORS and zinc work together to combat acute pediatric diarrhea. Zinc strengthens the ability of the immune system to fight infection and stop diarrhea, while ORS treats and prevents dehydration.
- In addition to stopping diarrhea, zinc protects children from future cases of diarrhea for up to three months. However, the protective benefit of zinc can only be obtained if a child is administered a complete 10-day course of treatment.
- Zinc stops diarrhea fast. A 10-day course of zinc does not mean that it will take 10 days for the diarrhea to stop.

Customers frequently base their knowledge and perceptions of a treatment on either previous personal experience or recommendations from more experienced peers and relatives. As such, the dissemination of key messages needs to place more emphasis on interpersonal channels. Community-level “zinc champions”—such as queen mothers and female chiefs in Ghana, for example (see text box)—can be engaged for peer-to-peer marketing of ORS and zinc.

Queen mothers and chiefs

Chiefs are the traditional authorities in Ghanaian communities. Queen mothers wield social power, and have the authority to select and dismiss chiefs. Queen mothers advocate for the welfare of community members, especially women and children.

Source: UNICEF

Improve stakeholder coordination at all levels of the health system.

The solution to decreasing the incidence of suboptimal diarrhea treatment dispensing extends along the entire health care continuum. In discussions, some medicine sellers felt their efforts to promote and dispense ORS and zinc were undermined by the fact that antibiotics are

still consistently prescribed for diarrhea in hospitals and clinics. Although it may be the case that many higher-level providers are appropriately dispensing antibiotics for the treatment of more complicated diarrhea, customer focus group data suggest that customers do not walk away from these encounters with an understanding of *why* antibiotics are needed for certain cases of diarrhea and not others. The potential failure of clinical providers to educate their patients about appropriate management of pediatric diarrhea may mistakenly perpetuate a belief that antibiotics are the “doctor-approved” treatment for all subsequent episodes of diarrhea. This trend supports implementing efforts that work with higher-level providers to:

- Educate patients about the appropriate treatment of acute pediatric diarrhea, including a discussion of why ORS and zinc alone are effective in treating most cases of pediatric diarrhea and what danger signs to look out for (i.e., blood in the stool or dehydration) that indicate a need to seek care from a clinical provider.
- Build a collaborative referral system with medicine sellers that reinforces their role as frontline treatment providers for acute pediatric diarrhea and ensures better identification and referral of patients with severe dehydration, non-viral diarrhea, and co-morbidities.



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