

Can Mobile Phone Messages to Licensed Chemical Sellers Increase Prescription of Zinc? – A Randomized Controlled Trial in Ghana

Minki Chatterji, Willa Friedman, Benjamin Woodman, and Odartei Lamptey

Background

Diarrhea and dehydration remain leading causes of death among children in much of the developing world, including Ghana. Zinc sulfate and oral rehydration solution (ORS) have been the standard of care for the treatment of acute diarrhea in children under five since May of 2004 when WHO and UNICEF issued a joint statement supporting their use. However, many other less effective and costlier treatments - including antimicrobials - are often prescribed instead. Given the limited resources available for training and behavioral communication campaigns, the international health community is continuously seeking to discover and test new and cost-effective innovations that can assist in the battle against diarrhea and dehydration.

This study uses a randomized control trial (RCT) study design to evaluate a program to encourage prescription of zinc and ORS through licensed chemical sellers (LCSs)¹ in three regions in Ghana. The intervention uses mobile phone text messages (SMS) provided to LCSs and their shop assistants to reinforce sensitization training related to the encouragement prescription of ORS and zinc, in place of antimicrobials in the treatment of acute diarrhea. The evaluation measures the impact of the SMS mobile phone text messages by comparing the prescription behavior of the LCSs who received both the messages and training versus those who received only training.

The intervention assigned half of these LCSs to a treatment involving text messages and interactive quizzes sent via mobile phones, to encourage them to apply what they learned in the training in prescribing these effective treatments. These text messages are designed by experts in the use of SMS technology in changing provider behavior. This intervention reinforced a sensitization training attended by both the treatment and the control group, in which licensed chemical sellers were invited to learn about the effectiveness of zinc and ORS to treat uncomplicated diarrhea. This training also stressed the lack of necessity of antimicrobials, which are currently used in nearly 35 percent of all pediatric diarrhea cases, and in 31 percent of cases in which there is no blood in the child's stools in Ghana.²

This study will contribute to the existing literature on changing health provider behavior with a focus on private providers. In addition, this evaluation will contribute to the knowledge base regarding the use of SMS to reinforce trainings in changing provider behavior. Finally, the results of this evaluation encouraging prescription of zinc will be informative for future campaigns to effectively introduce new products to health providers as such products are developed.

Literature Review

As zinc is a relatively new treatment for diarrhea management, there is limited research related to prescription-behavior of providers. A large project in Bangladesh to help providers begin prescribing zinc for childhood diarrhea was received well by providers who reported that it was

1 In Ghana, Licensed Chemical Sellers (LCSs) have at least a secondary education, basic training in drug dispensing, and are permitted to sell an approved list of prescription drugs. The LCSs are licensed by the Ghana Pharmacy Council, which requires them to attend its annual continuing education sessions.

2 Ghana Demographic and Health Survey 2008.

helpful to have the additional training and information; however, such study could not isolate the true impact of the program.³

Previous research has measured the effectiveness of other strategies designed to change provider behavior with respect to treatment of diarrhea. Ross-Degnan et al (1996) used face-to-face educational outreach to encourage providers in Kenya and Indonesia to provide ORS in place of antimicrobials, and found that this intervention was associated with increased knowledge and use of ORS.⁴ Santoso et al (1996) compared small and large group interventions designed to increase the use of ORS in place of antimicrobials in Indonesia. They found that the small group interventions are more effective at increasing knowledge; however, the face-to-face small group meetings were quite expensive and the authors concluded that they may not be cost-effective.⁵

Meta-studies analyzing interventions to change provider behavior related to other illnesses show mixed results. In one meta-study examining the impact of a range of interventions to improve medicine sellers' treatment of malaria, Goodman et al (2007) argued that there is no conclusive evidence about the effectiveness of many different interventions.⁶ In a similar meta-study, Brieger et al (2005) concluded that although there is good evidence of training improving provider knowledge, there is insufficient evidence on the link between these trainings and practice.⁷ Another meta-analysis of private sector training concludes that while many interventions to train providers in the private sector have been well-received, more rigorous evaluation is needed to measure effectiveness and document long-run effectiveness.⁸

There is a large literature from public health, health economics, and recently behavioral economics on the use of SMS technology to encourage behavior change among consumers. However, these programs typically focus on encouraging people to do things that they know and agree they should do but either procrastinate (eg: exercise, begin saving, choose a retirement plan) or forget about (take medicine, pay bills⁹). Another set of studies focuses on the viability of using mobile phones to facilitate communication that was previously too costly. For example, community health workers can use mobile phones to contact experts when confronted with complicated cases, or provide personalized health status information to individuals.

-
- 3 Larson CP, Koehlmoos TP, Sack DA, and the Scaling Up of Zinc for Young Children (SUZY) Project Team (2011). Scaling up zinc treatment of childhood diarrhoea in Bangladesh: theoretical and practical considerations guiding the SUZY Project. *Health Policy and Planning*;1-13.
 - 4 Ross-Degnan D, Soumerai SB, et al. The impact of face-to-face educational outreach on diarrhoea treatment in pharmacies. *Health policy and planning* 1996; 1(3): 308-318.
 - 5 Santoso B, Suryawati S, et al. (1996). Small group intervention vs formal seminar for improving appropriate drug use. *Social Science and Medicine* . 1996; 42(8): 1163-1168.
 - 6 C Goodman, W Brieger, A Unwin, A Mills, et al. Medicine Sellers and Malaria Treatment in Sub-Saharan Africa: What Do they Do and How Can their Practice be Improved? *American Journal of Tropical Medicine and Hygiene* . 2007 December; 77(6 Suppl): 203–218.
 - 7 Brieger W, Unwin A, Greer G, and Meek S. 2005. Interventions to Improve the Role of Medicine Sellers in Malaria Case Management for Children in Africa. London, UK and Arlington, Va., USA: the Malaria Consortium and BASICS for the United States Agency for International Development; prepared for Roll Back Malaria's Sub-group for Communication and Training and Malaria Case Management Working Group.
 - 8 Waters H, L Hatt and H Axelsson. Working with the Private Sector for Child Health. Paper prepared for the SARA Project and the Inter-Agency Working Group on Private Participation and Child Health, Washington DC, June 2002.
 - 9 Cadena, Ximena, and Antoinette Schoar, "Remembering to Pay? Reminders vs. Financial Incentives for Loan Payments," NBER Working Paper Number 17020.

There appear to be few studies that evaluate the use of SMS to change health provider behavior. In 2011, the SHOPS project conducted a process evaluation of an SMS pilot in Uganda that sent messages to providers to reinforce lessons that they learned in training sessions. SMS recipients noted that the intervention led to: motivation to adhere to hygiene standards and patient care.¹⁰

Research Questions

The evaluation will attempt to answer several research questions:

1. Do text messages to reinforce sensitization affect knowledge and attitudes of LCS toward zinc for uncomplicated diarrhea?
2. Do text messages to reinforce sensitization affect knowledge of and attitudes of LCS toward ORS for uncomplicated diarrhea?
3. Do text messages to reinforce sensitization training increase prescription of zinc for uncomplicated diarrhea?
4. Do text messages to reinforce sensitization increase prescription of ORS for uncomplicated diarrhea?
5. Do text messages to reinforce sensitization decrease prescription of antimicrobials for uncomplicated diarrhea?

Study Design and Intervention

The sample universe is all LCS facilities within 26 (out of 39) randomly selected districts in three regions of Ghana: Greater Accra, Central Region, and Western Region. The Pharmacy Council maintains a list of LCS by district. All 3056 facilities in these 26 districts were invited to participate in the sensitization trainings, and facilities were allowed to send up to one LCS and all shop assistants. 1122 facilities sent a total of 1994 participants to the trainings held in April-May 2012. Participants in the training were asked if they wanted to opt-in to the possibility of receiving SMS messages related to diarrhea management. 957 participants representing 911 facilities opted in to potentially receive SMS.

Treatment assignment is at the level of the facility (LCS and respective shop assistants who attended the sensitization training). Randomizing at the facility level reduces concerns of contamination across treatment groups by ensuring that all coworkers have the same assignment.

The total sample for the evaluation includes 911 opted-in facilities that were randomly assigned to treatment and control groups, stratifying on district. Less than one half (479 facilities) received the SMS intervention from June-August 2012, and the other half did not. This SMS intervention consisted of eight tips and nine quizzes over eight weeks (June 11 – Aug 3, 2012).

Data

10 SHOPS – “Mobiles for Quality Improvement Pilot in Uganda” December 2011

Outcomes will be measured using both face-to-face provider interviews and mystery-client surveys conducted at LCS facilities in August-October 2012. For both the provider and mystery-client surveys, enumerators interview the first available provider – LCS or shop assistant. The mystery-client survey takes place first. Data will be analyzed at the facility level. As a follow-up to the main analysis, we investigate the cost effectiveness of the intervention, measuring the actual and feasible costs of the intervention.

Given certain limitations, including the combination of extremely low initial zinc usage *and* a concurrent set of public information campaigns planned to increase its usage, we opted for expanding the follow-up sample and not conduct a baseline survey. Because of simultaneous campaigns to increase zinc usage, a baseline survey is not likely to have provided a relevant benchmark with which to compare the outcomes in the treatment group. Randomization provides a credible estimate of the counterfactual (the outcomes that would have been observed in the treatment group, had they not been treated).

Expected Findings

Preliminary results show a substantial increase in provider knowledge about diarrhea treatment among the treatment group relative to the control group. Results for the full sample will be available soon and we will be able to see if this increase in knowledge translates into a change in provider behavior. If knowledge increases but behavior does not change, then this implies that the barrier to the use of the new product may not be information among providers and interventions should be designed to address alternative issues, including financial incentives and consumer demand. Questions from the provider survey will allow us to delve deeper into understanding mechanisms.