The impact of face-to-face educational outreach on diarrhoea treatment in pharmacies

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Private pharmacies are an important source of health care in developing countries. A number of studies have documented deficiencies in treatment, but little has been done to improve practices. We conducted two controlled trials to determine the efficacy of face-to-face educational outreach in improving communication and product sales for cases of diarrhoea in children in 194 private pharmacies in two developing countries. A training guide was developed to enable a national diarrhoea control programme to identify problems and their causes in pharmacies, using quantitative and qualitative research methods. The guide also facilitates the design, implementation, and evaluation of an educational intervention, which includes brief one-on-one meetings between diarrhoea programme educators and pharmacists/owners, followed by one small group training session with all counter attendants working in the pharmacies.

We evaluated the short-term impact of this intervention using a before-and-after comparison group design in Kenya, and a randomized controlled design in Indonesia, with the pharmacy as unit of analysis in both countries (n = 107 pharmacies in Kenya; n = 87 in Indonesia). Using trained surrogate patients posing as mothers of a child under five with diarrhoea, we measured sales of oral rehydration salts (ORS); sales of antidiarrhoeal agents; and history-taking and advice to continue fluids and food. We also measured knowledge about dehydration and drugs to treat diarrhoea among Kenyan pharmacy employees after training.

Major discrepancies were found at baseline between reported and observed behaviour. For example, 66% of pharmacy attendants in Kenya, and 53% in Indonesia, reported selling ORS for the previous case of child diarrhoea, but in only 33% and 5% of surrogate patient visits was ORS actually sold for such cases. After training, there was a significant increase in knowledge about diarrhoea and its treatment among counter attendants in Kenya, where these changes were measured. Sales of ORS in intervention pharmacies increased by an average of 30% in Kenya (almost a two-fold increase) and 21% in Indonesia compared to controls (p<0.05); antidiarrhoeal sales declined by an average of 15% in Kenya and 20% in Indonesia compared to controls (p<0.05). There was a trend toward increased communication in both countries, and in Kenya we observed significant increases in discussion of dehydration during pharmacy visits (p<0.05).

We conclude that face-to-face training of pharmacy attendants which targets deficits in knowledge and specific problem behaviours can result in significant short-term improvements in product sales and communication with customers. The positive effects and cost-effectiveness of such programmes need to be tested over a longer period for other health problems and in other countries.
Introduction

Dehydration due to diarrhoea remains a major cause of preventable morbidity and death among infants and children in developing countries. Since its inception, the World Health Organization Programme for the Control of Diarrhoeal Diseases (WHO-CDD) has focused on improving diarrhoea case management by government health workers and parents. While these efforts have increased use of oral rehydration salts (ORS) and reduced mortality, inappropriate treatment in private pharmacies has limited further gains in health status. These two studies evaluate a WHO-CDD demonstration project designed to enable national CDD programmes to include in their remit private pharmacists and licensed sellers of drugs.

Drug retailers are an important source of health care in many parts of the developing world. In addition to selling drugs prescribed by physicians, pharmacies often serve as primary sources of information about illness and drug therapy. Consumers in many cultures prefer pharmacies and drug shops to other health care providers because they are conveniently located, waiting times are shorter, staff are less socially distant than other health workers, and there is no separate charge for advice. Increasing privatization of health care in many countries may further increase the role of pharmacies and drug shops in primary health care.

Numerous studies have shown that pharmacies selling drugs without prescription often do so inappropriately and with little scientifically substantiated advice about medicines or illness. Since many pharmacists are not allowed to dispense most drugs without prescription, their training rarely provides adequate information about therapeutics. In addition, although many countries require that pharmacies be owned or managed by a trained pharmacist, customers are often seen by untrained attendants. The lack of scientific knowledge is further complicated in this setting by economic incentives, strong consumer drug preferences, inappropriate commercial drug information, and intensive pressure by drug company representatives to sell specific products.

Few studies have focused on methods to improve treatment in pharmacies. A few countries have established social marketing programmes to promote sales of safe contraceptives and commercial ORS in pharmacies and drug shops, but the extent of their impact is unknown. One innovative programme in Kenya, jointly sponsored by a drug company and the Ministry of Health, reported an increase in sales of flavoured ORS marketed in rural retail kiosks, but the programme was discontinued because it was not commercially viable. A study in Bangkok showed no impact of mailing educational material about diarrhoea treatment to pharmacies and retail drug stores.

CDD programmes have traditionally dealt with the public sector. Targeting private sector pharmacies represents a substantial shift in perspective, skills, and training modes. We have previously presented a behavioural framework for approaching interventions in this sector. Here, we report short-term results of a persuasive strategy in two developing countries.

Methods

Structure of the intervention

This paper describes the results of a field test using the WHO-CDD Guide for Improving Diarrhoea Treatment Practices of Pharmacists and Licensed Drug Sellers (the Guide) in two countries, Kenya and Indonesia. The programme's specific objectives were: to increase the capacity of a national CDD programme to plan and undertake a persuasive training intervention; to improve the knowledge of target pharmacists and counter attendants about diarrhoea, specific drugs to treat it, and proper case management; and to improve actual treatment practices in pharmacies, specifically to increase sales of ORS, to decrease sales of antidiarrhoeals and antibiotics, to increase appropriate questioning about diarrhoea history and etiology, and to improve advice about referral and prevention.

All programme activities were carried out by implementation teams led by the Directors of the Ministry of Health CDD programmes, and included CDD staff and representatives of university faculty, the National Pharmaceutical Society, UNICEF and other non-governmental organizations, or local private sector consulting firms.

The Guide describes a four-stage process to:
1) Assess knowledge and actual treatment practices;
2) Identify underlying motivations and constraints to changing practices;
3) Design a persuasive educational intervention
through brief face-to-face encounters; and
4) Carry out and evaluate the intervention.

**Baseline assessment of knowledge, practices and motivations**

As a first step in understanding the behaviour of private sector drug sellers, the Guide recommends an interview survey with a sample of pharmacy owners, pharmacists, and counter attendants to assess knowledge about diarrhoea and the drugs used to treat it. Following these interviews, actual practices are observed through surrogate patient visits by confederates posing as the mothers of children with diarrhoea and asking for advice about treatment. These visits have been shown to be reliable methods for measuring diarrhoea treatment in pharmacies in other descriptive studies.7,15,23,26 Confederates are trained to respond in a standard way in the local vernacular to questions raised by the counter attendant. In this study, confederates described a simple case of watery diarrhoea of short duration that should require no treatment other than ORS. Confederates purchased whatever drugs were recommended during these visits, and, after leaving the shop, recorded on a standard data collection form: 1) questions asked by the attendant about signs and symptoms; 2) advice given about drugs sold; and 3) advice given about home case management, prevention, or referral.

In Kenya, the market survey consisted of 70 pharmacies in the towns of Nairobi, Nakuru, Thika, Ruur, and Kisumu. In Indonesia, the survey took place in Jakarta, Bogor, Bekasi, and Tangerang, and the sample included 19 pharmacies, 22 over-the-counter drug stores, and 8 small scale drug sellers; only the pharmacy results are presented here.

In order to learn more about factors underlying observed behaviour, the Kenya team conducted 8 focus group discussions (FGDs), four with trained pharmacists, three with untrained counter attendants, and one with pharmacy owners. The Indonesia team conducted 6 FGDs with heterogeneous groups including pharmacy owners, assistant pharmacists, and counter attendants.

**Educational messages**

Based on the results of both the market assessment and the FGDs, the teams developed and pre-tested printed materials containing the main intervention messages (see examples in Figure 1). In Kenya, these included three materials promoting ORS, food, and fluids as the recommended treatment for diarrhoea (a brochure for pharmacy personnel, a poster aimed at mothers to be displayed in the shop, and leaflets to distribute to mothers), and a brochure aimed at pharmacy staff discouraging use of antidiarrhoeals.

In Indonesia, printed materials included a poster and a counter display aimed at customers; the back of the counter display contained information useful for pharmacy staff to teach mothers about ORS preparation. These materials contained messages promoting ORS, breastfeeding, and feeding in diarrhoea treatment. In-depth interviews with pharmacy staff revealed reluctance to display materials that would overtly discourage use of antidiarrhoeals. However, the training in both countries covered the dangers of antidiarrhoeals and the reasons for not recommending them.27

**Face-to-face intervention**

Pharmacists and counter attendants were trained in short interactive sessions by outreach educators familiar with techniques of effective communication, using training formats adapted to fit local needs and resources. This training model, when used to promote appropriate scientific practice, has been described as ‘academic detailing’.28 To enhance its impact, the interventions were supported by sponsors credible to pharmacists such as the WHO, the national Pharmacists’ Association, a university school of pharmacy, or the national CDD programme. The effectiveness of this approach for changing drug prescribing among physicians in developed countries has been consistently proven in previous studies.28-32 There have been no published studies of its use in the developing world, either among trained health workers or in the private retail sector.

Outreach educators in both study countries were trained about diarrhoea and its appropriate management in pharmacies, data on current practices, and techniques of interactive communication for adult learning.28 Four Ministry of Health personnel served as the outreach educators in Indonesia, while 6 staff from the Faculty of Pharmacy and the Medical Training Centre fulfilled this role in Kenya. In both countries, the intervention began with brief one-on-one meetings with pharmacists/owners discussing key training messages and ways to deal with perceived barriers to practice recommendations, followed by training of all counter attendants in group sessions of 5–10 attendees organized close to their shops. These sessions (2–3 hours on a single day in Kenya; two days in Indonesia) covered the aetiology of
diarrhoea, its effects on the body, and its proper management. Trainees received posters and patient education materials for display in their shops. Trainees and pharmacy owners were not informed that the sales practices in their pharmacies would be evaluated.

**Research design and sample**

In Kenya a randomized, controlled trial was impractical, because pharmacies are clustered in cities and towns, and experimental-control contamination was likely. Therefore, the study utilized a quasi-experimental design, with measurement of outcomes before and after training in a sample of study pharmacies and in a comparison group. The sampling frame included all pharmacies located in Nairobi, Nakuru, Kisumu, and Mombasa, identified from retail pharmacy lists from the Ministry of Health and the Pharmaceutical Society of Kenya. In Nairobi, 62 pharmacies were randomly selected, while all 50 pharmacies located in the other towns were included; analyses are limited to the 58 pharmacies in Nairobi and 49 in other towns in which outcomes were measured both before and after the intervention.

Training took place in two phases. Nairobi pharmacies (Group 1, n=58) received the intervention in the first phase, while pharmacies from Nakuru and Kisumu (Group 2, n=24) received training in the second phase (and were controls in the first phase); pharmacies from Mombasa (Group 3, n=25) received no training and served as controls throughout the study period. The training programme included a total of 90 pharmacists and 162 counter attendants in study pharmacies. Outcomes were measured in all groups before and after the first wave of training, and again after the second wave in Group 2 and Group 3 pharmacies only. Thus, we were able to measure the short-term impacts of training in Nairobi pharmacies compared to concurrent changes in all other towns, and at a later point in time, short-term impacts of training in Group 2 pharmacies compared to concurrent changes in Group 3.

The Indonesia team selected a purposive sample of 87 pharmacies from Jakarta, and the neighbouring communities of Bogor, Tangerang, and Bekasi. Pharmacies were first stratified by geographic location and their baseline practices, and then randomly assigned...
to intervention (n=43) and control (n=44) groups from within these strata. Analyses are limited to the 42 pharmacies in the intervention group and the 41 in the control group in which outcomes were measured both before and after the intervention.

In Kenya, to measure changes in knowledge, educators administered a ten-question instrument to all pharmacy assistants before and after training. Items were presented in a different order in the pre- and post-tests. Of the 128 assistants who attended training, 109 completed both questionnaires. A paired t-test was used to test the significance of improvements in knowledge as a result of training.

To measure changes in treatment practice, all pharmacies included in the study in both countries were visited by surrogate patients as described above. These surrogate patients were blind to the purpose of the study, and to the study or control status of the pharmacies. In Indonesia, a single visit was made to each pharmacy one month before and after training. In Kenya, surrogate patients made two visits per pharmacy per period (2–4 weeks before the first training, and then 2–4 weeks following each wave of training). In all cases, a single surrogate patient never visited the same pharmacy more than once.

The significance of observed changes in target practices were determined differently in the two countries. In Indonesia, with one visit per pharmacy per period, we computed group averages and used simple t-tests to test the significance of pre-post differences. In Kenya, with multiple visits per pharmacy, we first calculated for each pharmacy the proportion of visits pre and post during which a given outcome was observed (e.g. sale of ORS), then we calculated the change in this proportion between the two waves of data collection. Finally, we used t-tests to determine the significance of differences between study and control groups.

Results
Baseline assessments
In the Kenya pharmacies, respondents to the baseline survey reported an average of 27 customers per week seeking care for diarrhoea, over half (53%) for a child under five. In Indonesia, respondents reported 15 customers per week seeking diarrhoea treatment, with about one-third of these (37%) for children.

In Kenya, 87% of respondents understood about fluid loss during diarrhoea, and 67% considered fluid replacement to be the most important aspect of treatment. In Indonesia, however, only 21% of respondents adequately understood fluid loss, and 16% considered fluid replacement of paramount importance.

ORS was widely available at the time of the surveys in all pharmacies, with up to 7 different products found in Indonesian pharmacies, and up to 6 in Kenya. However, antidiarrhoeal preparations were available in much wider variety, with 71 different brands reported in Indonesia and 22 brands in Kenya.

Figure 2 contrasts the products that survey respondents reported they sold to the previous customer having a child with diarrhoea versus the products actually sold during baseline surrogate patient visits. It is clear that reported and observed practices differ widely. The majority of pharmacy staff, 66% in Kenya and 53% in Indonesia, reported that they sold ORS to the last customer, but during surrogate patient visits, only 33% of confederates in Kenya and 5% in Indonesia were actually sold ORS. The reverse was true for anti-diarrhoeals; in Kenya, reported use was 33% while observed use was 48%, and in Indonesia reported vs. observed use were 58% and 74%, respectively.

Motivations and constraints
Focus groups (pre-intervention) examined the reasons for the divergence between reported and observed practices. Awareness of ORS among pharmacy staff was high in both countries: however, many focus group participants expressed a feeling that ORS was merely ‘good first aid and not the key to treatment. Respondents reported that both they and their customers wanted something ‘stronger’ than ORS to stop diarrhoea and treat its cause. Other reported determinants of practice included the prescribing practices of local doctors, product advertising, and drug company sales representatives and information.

In Kenya, pharmacy staff mentioned that they did not have leaflets promoting ORS like other drugs. In Indonesia, respondents exhibited a strong attachment to particular anti-diarrhoeals, and mentioned personal experience with these drugs as a factor in determining their preferred treatment.

Pharmacy staff in both countries acknowledged the importance of profit as a motive, preferring drugs that yielded higher profit. However, the difference
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Knowledge of counter assistants in Kenya about fluid loss and the role of ORS in dehydration was high both before and after training (Table 1). However, knowledge about signs indicating bacterial etiology and about the use of antibiotics was much lower. After training, pharmacy assistants recognized more signs of bacterial diarrhoea (+0.18, 95% confidence interval = [0.02,0.34]), and knowledge that antibiotics are useful in only these cases increased (+0.20, 95% CI = [0.08,0.32]). Training was also associated with an increase in the number of situations (e.g. child has fever) recognized by trainees as reasons for referral (+0.44, 95% CI = [0.27,0.63]).

Impact of training on drug sales

In Kenya, sales of ORS differed at baseline among Group 1 intervention pharmacies in Nairobi (46% of visits), Group 2 intervention pharmacies in smaller towns (19%), and control pharmacies in Mombasa (26%) (Figure 3). Despite having the highest sales of ORS at baseline, use of ORS increased by 33% in Nairobi following the first wave of training, compared to a slight increase of 4% in Group 2 pharmacies and no change in Mombasa pharmacies (intervention vs all other pharmacies = +32%, 95% CI = [15%,48%]). After the next round of training, use of ORS increased by 23% in Wave 2 pharmacies, compared to a decrease of 3% in controls (+26%, 95% CI = [-1%,53%]). In Indonesia, where baseline use of ORS in the study groups was equal at about 40%, the intervention group increased ORS sales by 34% after training, compared to an increase of 13% among controls (+21%, 95% CI = [3%, 39%]).

Figure 4 summarizes the impact of training on sales of antidiarrhoeals. As with ORS, sales of antidiarrhoeals in Kenya differed somewhat at baseline among Group 1 intervention pharmacies (44%), Group 2 intervention pharmacies (36%), and control pharmacies (62%). Sales of antidiarrhoeals decreased by 17% in Nairobi following the first wave of training, compared to an increase of 2% in both Group 2 and control pharmacies (Group 1 vs. all other pharmacies = -19%, 95% CI = [-36%, -3%]). After the next round of training, sales of antidiarrhoeals decreased by 5% in Group 2 pharmacies, while they increased by 2% among controls (-7%, 95% CI = [-27%,13%]). In Indonesia, where antidiarrhoeals were used by about two-thirds of pharmacies in both groups at baseline, intervention pharmacies decreased antidiarrhoeal sales by 29% after training, compared to a decrease of 9% among controls (-20%, 95% CI = [-39%, -3%]).

The use of antimicrobial products was also discouraged except in cases of diarrhoea with possible bacterial origin. However, overall rates of antibiotic use were already low at baseline in both countries (13% in Kenya and 2% in Indonesia). Modest declines in use following training in Kenya were not analyzed statistically.
### Table 1. Impact of training on key knowledge indicators among pharmacy assistants in Kenya

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Maximum score</th>
<th>Pre (S.E.)</th>
<th>Post (S.E.)</th>
<th>Difference* (95% C.I.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total knowledge score</td>
<td>10</td>
<td>4.60 (0.15)</td>
<td>5.49 (0.17)</td>
<td>+0.88*** (-0.62, 1.16)</td>
</tr>
<tr>
<td>Fluid loss is the reason diarrhoea is dangerous</td>
<td>1</td>
<td>0.80 (0.04)</td>
<td>0.81 (0.04)</td>
<td>+0.01 (-0.09, 0.11)</td>
</tr>
<tr>
<td>ORS replaces lost water and minerals</td>
<td>1</td>
<td>0.80 (0.04)</td>
<td>0.86 (0.03)</td>
<td>+0.06 (-0.02, 0.14)</td>
</tr>
<tr>
<td>Signs of bacterial etiology (blood in stool, frequency, fever)</td>
<td>3</td>
<td>1.54 (0.08)</td>
<td>1.72 (0.06)</td>
<td>+0.18** (-0.09, 0.34)</td>
</tr>
<tr>
<td>Antibiotics useful only to treat diarrhoea of bacterial etiology</td>
<td>1</td>
<td>0.34 (0.05)</td>
<td>0.54 (0.05)</td>
<td>+0.19*** (0.08, 0.32)</td>
</tr>
<tr>
<td>Antidiarrhoeals never useful and are unnecessary risk and expense</td>
<td>2</td>
<td>0.58 (0.04)</td>
<td>0.95 (0.06)</td>
<td>+0.37*** (0.27, 0.48)</td>
</tr>
<tr>
<td>When to refer (child has fever, diarrhoea continues, bloody stool)</td>
<td>3</td>
<td>1.76 (0.08)</td>
<td>2.21 (0.10)</td>
<td>0.44*** (0.27, 0.63)</td>
</tr>
</tbody>
</table>

**Notes:**

- * average difference of paired pre-post scores.
- ** pre-post increase significant, p<0.05.
- *** pre-post increase significant, p<0.01.

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**Kensya Pharmacies**

<table>
<thead>
<tr>
<th>% Surrogate Patient Visits Receiving ORS</th>
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</thead>
<tbody>
<tr>
<td>Group 1 (n=58)</td>
<td>100%</td>
<td>80%</td>
<td>60%</td>
</tr>
<tr>
<td>Group 2 (n=24)</td>
<td>100%</td>
<td>80%</td>
<td>60%</td>
</tr>
<tr>
<td>Control (n=25)</td>
<td>100%</td>
<td>80%</td>
<td>60%</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>% Surrogate Patient Visits Receiving Antidiarrhoeals</th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (n=58)</td>
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<td>80%</td>
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<tr>
<td>Group 2 (n=24)</td>
<td>100%</td>
<td>80%</td>
<td>60%</td>
</tr>
<tr>
<td>Control (n=25)</td>
<td>100%</td>
<td>80%</td>
<td>60%</td>
</tr>
</tbody>
</table>

**Indonesia Pharmacies**

<table>
<thead>
<tr>
<th>% Surrogate Patient Visits Receiving ORS</th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Intervention (n=43)</td>
<td>100%</td>
<td>80%</td>
<td>60%</td>
</tr>
<tr>
<td>Control (n=44)</td>
<td>100%</td>
<td>80%</td>
<td>60%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% Surrogate Patient Visits Receiving Antidiarrhoeals</th>
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<tbody>
<tr>
<td>Intervention (n=43)</td>
<td>100%</td>
<td>80%</td>
<td>60%</td>
</tr>
<tr>
<td>Control (n=44)</td>
<td>100%</td>
<td>80%</td>
<td>60%</td>
</tr>
</tbody>
</table>

**Figure 3.** Effect of persuasive training on sales of ORS to treat diarrhoea as measured during surrogate patient visits to private pharmacies.

**Figure 4.** Effect of persuasive training on sales of antidiarrhoeals to treat diarrhoea as measured during surrogate patient visits to private pharmacies.
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Communication

The number of questions about symptoms of diarrhoea asked by counter attendants before making a product recommendation was low, averaging 1.2 at baseline in Indonesia and 1.5 in Kenya. In all intervention groups in both countries, the number of questions increased following training compared to slight reductions observed in control pharmacies, although these increases are not statistically significant. The frequency of individual types of communication recorded in Indonesia was too low to justify further analysis.

Three key symptoms to determine severity and type of diarrhoea are blood in the stool, vomiting, and fever. In Kenya, questioning about both blood in the stools and vomiting increased in both intervention groups following training compared to controls (Table 2). Questioning about fever showed little change in either group. None of these results were statistically significant. Compared to control pharmacies, dehydration was discussed in 13% more follow-up visits in both Group 1 (95% CI = [0.02,0.25]) and Group 2 pharmacies (95% CI = [0.04,0.21]).

Discussion

Using the process outlined in the Guide, teams led by the CDD Program Directors in Indonesia and Kenya were able to assess baseline diarrhoea treatment practices in private pharmacies and their causes, and to design and implement a training intervention based on a persuasive educational model that led to measurable improvements in treatment practices among pharmacy staff in both countries.

Baseline awareness of ORS and its function was high in both countries, although focus groups revealed that the staff felt that ORS was not as ‘powerful’ as antidiarrhoeal agents. Knowledge about other products, about non-pharmacologic treatments, and about the danger signs which would indicate the need for medical treatment was limited. Consistent with studies in industrialized countries, self-reported practices (e.g. use of ORS) were substantially overstated in comparison to observed behaviours.

Following training, product sales in both countries invariably changed in the direction of key recommended practices. Overall, sales of ORS nearly doubled in comparison to baseline values. In Kenya, ORS sales increased significantly in Nairobi compared to control pharmacies, while increases just failed to achieve statistical significance in other towns, due to smaller sample size. In Indonesia, despite the fact that ORS sales in control pharmacies also increased by a third, intervention pharmacies nevertheless experienced significant increases in ORS use. In contrast, pre-intervention sales of antidiarrhoeal products were reduced by about a third in pharmacies which received training. In Kenya, mirroring the findings for ORS, declines in antidiarrhoeal sales were significant in Nairobi but not in other towns; in Indonesia, antidiarrhoeal sales declined somewhat in the control group, but sales in intervention pharmacies were nevertheless significantly lower.

Were the observed changes due simply to increased knowledge about diarrhoea and drugs? In the case of antidiarrhoeals where knowledge was poor, the intervention both increased knowledge and decreased product sales. In the case of ORS, baseline knowledge was already quite high. Nonetheless, ORS sales increased dramatically, indicating that such a persuasive intervention can also enable behaviour change by addressing barriers to change.

While we observed a trend toward increased communication, particularly in questioning customers for signs of bacterial diarrhoea and dehydration in Kenya, communication between counter attendants and customers remained poor in both countries.

Several threats to the validity of this controlled study deserve comment. In Kenya, selection of study and control groups was not random, but by geographic area. However, results of the intervention were consistent following both waves of training, thus replicating the findings in different environments. In Indonesia, where randomly allocated control and intervention pharmacies were mixed in the same geographic areas, changes in product sales indicate possible contamination of the control group; however, this would have reduced the size of observed effects reported above.

Surrogate patient visits did not measure behaviour in response to customer requests for specific products. However, studies of similar interventions in industrialized countries have succeeded in equipping health providers with skills to overcome such pressures, and strategies to overcome patient demand were also included in training in this study. It is possible that some pharmacy staff were aware of the role of the surrogate patients and changed their behaviour accordingly. However, different assessors
Table 2. Impact of training on communication during sales encounters in Kenya pharmacies

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Training Group 1</th>
<th></th>
<th>Training Group 2*</th>
<th></th>
<th>Group 3 Controls*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before training</td>
<td>Change after training (S.E.)</td>
<td>Before training</td>
<td>Change after training (S.E.)</td>
<td>Before training</td>
<td>Change after training (S.E.)</td>
</tr>
<tr>
<td>Average # history questions</td>
<td>1.69</td>
<td>+0.54 (0.30)</td>
<td>1.34</td>
<td>+0.19 (0.36)</td>
<td>0.92</td>
<td>-0.42 (0.23)</td>
</tr>
<tr>
<td>Ask about blood in stool</td>
<td>10%</td>
<td>+14%** (0.05)</td>
<td>20%</td>
<td>+3% (0.08)</td>
<td>9%</td>
<td>-4% (0.04)</td>
</tr>
<tr>
<td>Ask about presence of fever</td>
<td>32%</td>
<td>-3% (0.06)</td>
<td>17%</td>
<td>+4% (0.07)</td>
<td>8%</td>
<td>-2% (0.06)</td>
</tr>
<tr>
<td>Ask about presence of vomiting</td>
<td>29%</td>
<td>+9% (0.06)</td>
<td>12%</td>
<td>+16% (0.08)</td>
<td>14%</td>
<td>-2% (0.05)</td>
</tr>
<tr>
<td>Discuss signs of dehydration</td>
<td>9%</td>
<td>+13%** (0.05)</td>
<td>0%</td>
<td>+8%** (0.04)</td>
<td>4%</td>
<td>-5% (0.06)</td>
</tr>
</tbody>
</table>

Notes: * Scores before training are values during Wave 2 of the simulated patient visits. ** Pre-post difference significant, p<0.05.

visited each pharmacy in the baseline and follow-up assessments to minimize this possibility.

Not informing pharmacy staff that their practices were being evaluated also raises an ethical issue. However, taking consent from each pharmacy would have substantially increased the likelihood of bias. Surrogate patient visits have been used frequently in drug use research, but the circumstances in which they can be used ethically need to be clarified.

Conclusions

This pilot study of the WHO Guide represents the first controlled trial documenting the impact of persuasive training implemented by national CDD programmes in changing private sector retail practices. Although the results support the short-term efficacy of this approach, several questions remain about the ‘real-world’ effectiveness of such intervention models. In particular, more data are needed on the sustainability of the positive effects on drug sales. Given that surrogate patient visits proved relatively quick and inexpensive to implement, it is crucial that future interventions use this technique to measure both short and longer-term impacts. If the short-term improvements observed in this study do not persist, strategies will need to be developed to reinforce and sustain them.

If changes in behaviour appear to be long-lived, we also need more information about the resources and incentives necessary to continue such an activity over time and on a larger scale. One promising strategy to reinforce improvements and to extend the potential scope of these activities might be to involve ORS manufacturers and distributors as active partners in designing and implementing this intervention. Finally, future research should examine whether these results are generalizable to other country settings and to other important health problems commonly treated in pharmacies (e.g. acute respiratory infections or malaria) for which improvement in sales practices could substantially lessen the burden of illness in infants and children.

References

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24 Goel P, Ross-Degnan D, Soumerai S, Reich M, Berman P. Childhood diarrhoea treatment at retail pharmacies: Key determinants and persuasion as a policy intervention. (submitted)

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