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*PAEDIATRIC ASSOCIATION OF TANZANIA*



**FORMATIVE RESEARCH ON ZINC TREATMENT AS AN ADJUNCT THERAPY FOR CHILDHOOD  
DIARRHOEAL ILLNESS**

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## List of Abbreviations

<b>ADDO</b>	<b>Accredited Drug Dispensing Outlet</b>
<b>AIDS</b>	<b>Acquired Immune Deficiency Syndrome</b>
<b>DMO</b>	<b>District Medical Officer</b>
<b>HF</b>	<b>Health Facility</b>
<b>HIV</b>	<b>Human Immunodeficiency Virus</b>
<b>HKI</b>	<b>Helen Keller International</b>
<b>IHRDC</b>	<b>Ifakara Health Research and Development Centre</b>
<b>IMCI</b>	<b>Integrated Management of Childhood Illnesses</b>
<b>JHU</b>	<b>John Hopkins University</b>
<b>MoHSW</b>	<b>Ministry of Health and Social Welfare, United Republic of Tanzania</b>
<b>ORS</b>	<b>Oral Rehydration Solution</b>
<b>SSS</b>	<b>Sugar Salt Solution</b>
<b>PSI</b>	<b>Population Services International</b>
<b>RCH</b>	<b>Reproductive and Child Health</b>
<b>TEHIP</b>	<b>Tanzania Essential Health Intervention Project</b>
<b>TFDA</b>	<b>Tanzania Food and Drug Authority</b>
<b>VETA</b>	<b>Vocational Education and Training Authority</b>
<b>VHW</b>	<b>Village Health Workers</b>

## Executive Summary

**Background:** Tanzania has made considerable progress in reducing under-five mortality in recent years. The 2004-2005 Tanzania Demographic and Health Survey (TDHS) indicated a recent, rapid decline in under-five mortality, from 156 per 1000 live births 5-9 years prior to the survey, to 112 per 1000 0-4 years prior to the survey (1). Diarrhoea remains a significant cause of morbidity and mortality among Tanzanian children and contributes stunting and wasting. The 2004-05 TDHS found that 13% of children had diarrhoea during the previous two weeks, 47% were taken to a health care provider, 70% received some form of oral rehydration therapy, and 40% received syrups or tablets of some sort (1). Tanzania has higher rates of ORS use than most other African countries (2), but there is room for improvement. Meta-analyses of published studies on zinc as a therapy for acute and persistent diarrhoea show that children with acute diarrhoea have a lower probability of continuing the episode of diarrhoea if treated with zinc. Children with persistent (>14 days at the time of treatment) diarrhoea have a lower probability of continuing the episode of diarrhoea, and lower rates of treatment failure. Zinc for diarrhoea also decreases the incidence of diarrhoea in the months following the treatment. In May 2004, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) issued new recommendations for the management of all episodes of childhood diarrhoea including new low osmolarity Oral Rehydration Salts (ORS) and zinc for 10-14 days (3).

As Tanzania considers how to introduce zinc and low-osmolarity ORS and obtain high coverage in isolated rural areas and among the urban poor, operational issues must be examined at the country level such as: optimal packaging of zinc and ORS, the impact of zinc introduction on ORT and antibiotic use (4); compliance with a 10 to 14 day course of treatment (5); and coverage obtained and cost-effectiveness of different service delivery modalities such as village health workers and private pharmacies; and effectiveness of different behaviour change strategies for promotion of zinc and ORS.

**Objectives:** The objectives of the formative research were: 1) To elicit local terminology for diarrhoeal illnesses and the perceived causes and seriousness of diarrhoeal illness; describe sources of care for diarrhoea and common remedies used to treat diarrhoeal illness; and examine treatment practices of childhood diarrhoea in the home, including non-recommended treatments; 2) To examine reasons caretakers of children with diarrhoea seek treatment from different sources outside of the home, as well as to examine factors that inhibit parents from seeking outside care; 3) To characterize current use and efforts to promote ORS sachets in the community; to examine perceptions of ORS and zinc tablets as treatment of diarrhoea among families, community (public and private sector) and facility-based health workers; to develop and pre-test messages, counselling guidelines and job aids to promote proper treatment of diarrhoea with ORS and zinc; and 4) To define the specific role that village health workers (VHWs) currently play in the biannual vitamin A campaign and deworming intervention activities, and define roles they could play in introduction of zinc for diarrhoea in rural areas; identify factors that motivate and cause attrition for VHWs; and examine the roles of VHWs in their communities.

**Methods:** The study was conducted in Morogoro Rural and Kongwa Districts. The former was of interest due to its links to the national IMCI program and potential for examining how best to integrate zinc treatment for diarrhoea into the national IMCI strategy. The study employed: 1) Illness narratives with parents of children with diarrhoea; 2) Qualitative interviews with parents of children with diarrhoea and with Village Health Workers, owners of drug shops or other private sector providers and facility-based health workers; and 3) Direct observations of facility-based and community-based workers.

**Results:** In the two study sites 'diarrhoea' is not a single disease, but rather a cluster of related conditions referred to by different names, and thought to have distinct symptoms, causes, and preferred treatments. Classification of diarrhoea was mainly based on type of stool normally defined by stool colour and its softness. Modern medicines including ORS are viewed as highly

inappropriate for some locally-defined types of diarrhoea, and children afflicted by these types of diarrhoea will never be taken to health facilities.

The sequences of seeking care vary but the common one is starting at home with home treatments including herbal medicines, then to the health facility and finally to drug shop and in some cases to traditional healer. Children often receive both traditional and modern medicines for a case of diarrhoea. ORS are commonly used and popularly known as *maoro* or *mapakiti* and commonly used both at household level and in health facilities.

The study found a high, frequent and irrational use of antibiotics for diarrhoea treatment. This was partly due to the fact that providers in health facilities routinely prescribe antibiotics for diarrhoea. Drug shops are the most common sources of antibiotics. Drug shop owners acknowledged being unauthorized to sell antibiotics but reported that antibiotics were among the fastest selling commodities. Frequent reported stock outs of antibiotics in public health facilities was recorded.

There was a positive attitude to the idea of introduction of zinc as a treatment for diarrhoea. The majority of informants liked the packaging of the tablets, both the box/carton and the blister. The packaging was associated with quality and reliability of the medicines. The taste of the tablets was very much liked. Respondents also liked the tablet size, noting that it is appropriate for children under five. There were mixed feelings about the dosage. Many thought that the number of tablets (10) was too much and the length of the dosage is too long for some people to comply. There were no concerns recorded on colour of the tablets. The maximum price for a single dose of zinc tablets was Tshs 1000 and the minimum was Tshs 200. However, there were a significant number of participants who recommended that the tablets be available free of charge.

Village health workers had been found to play a very important role in health education and take part in health facility activities, filling the gap caused by shortage of health workers in the

facilities. The success of ORS in treating diarrhoea among rural population is partly attributed to efforts by VHWs who have sensitized and educated community members on its usefulness. VHWs can be employed in the same way for the introduction of zinc, i.e. for basic information dissemination, distribution and to sell or distribute zinc tablets.

Information, education and communication strategies on diarrhoea treatment are insufficient and health facility providers have not been effective communicators of diarrhoea related information to community due to being overburdened with big numbers of patients to attend. Village health workers and drug shop dealers have shown to be more effective in conveying messages on health interventions and treatment.

**Conclusion and recommendations:** A combination of health facility, drug shops and VHWs as a point of contact for managing children with diarrhoea and sources of zinc should be employed to optimize effective treatment of diarrhoea in children. Village health workers should be integrated in provision of zinc treatment from the outset. An effective communication strategy should be developed that would use multiple channels of communication and make information available through multiple service providers. We recommend immediate action to limit irrational use of antibiotics. The current regulations and their implementation are not working. Treatment of diarrhoea with zinc tablets provides one additional option for reducing unnecessary use of antibiotics. Zinc for diarrhoea treatment for children less than five years of age should be provided free in public and in non-profit health facilities according to the national guideline. If it must be sold, it should be made available at the minimum price possible, importantly not more than Tshs 200.

## Table of Contents

<b>List of Abbreviations</b>	<b>3</b>
<b>Executive Summary</b>	<b>4</b>
<b>Introduction</b>	<b>10</b>
Management of childhood diarrhoea in Tanzania	10
Zinc for childhood diarrhoea	11
Service delivery strategies for zinc and ORS	12
Objectives of this study	13
<b>Methods</b>	<b>14</b>
Data collection methods	14
Training of interviewers	16
Site selection	16
Interviews conducted	17
<b>Results: Local terminology, treatment practices and careseeking</b>	<b>18</b>
Symptoms and causes of diarrhoea, terminology for types of diarrhoea	18
Modern treatments for diarrhoea	22
Traditional treatments for diarrhoea	23
Treatment seeking behaviours	25
Administration of ORS and zinc	29
<b>Results: Service delivery strategies and channels of communication</b>	<b>31</b>
Observed Communication Channels	31
Counselling by facility-based providers	32
Counselling and health promotion by village health workers	33
<b>Recommendations: Local terminology, treatment practices and careseeking</b>	<b>34</b>

Local terminology for diarrhoeal illnesses	34
Antimicrobial use	36
Compliance with 10 days of zinc for diarrhoea	37
Cost and packaging of zinc tablets	38
<b>Recommendations: Service delivery strategies and channels of communication</b>	<b>38</b>
IMCI and quality of care for children with diarrhoea	39
Village health workers	40
Social marketing	42
Assessment of the service delivery and behaviour change strategies	43
<b>References cited</b>	<b>43</b>

## Tables and Figures

Table 1	Interviews conducted by methods and by districts.....	17
Table 2	Types of Interviews by Methods.....	18
Table 3	Local terms for different types of diarrhoea .....	20
Table 4	Types of diarrhoea, perceived causes, symptoms and treatment .....	21
Table 5	Reasons people use or avoid using antibiotics .....	23
Table 6	Traditional medicines and practices used to treat different types of diarrhoea .....	24
Table 7	Factors affecting care seeking .....	28
<b>Figure 1.</b>	Care seeking patterns for diarrhoea illnesses .....	27

## Introduction

### Management of childhood diarrhoea in Tanzania

Tanzania has made considerable progress in reducing under-five mortality in recent years. The 2004-2005 Tanzania Demographic and Health Survey (TDHS) indicated a recent, rapid decline in under-five mortality, from 156 per 1000 live births 5-9 years prior to the survey, to 112 0-4 years prior to the survey (1). This downward trend in under-five mortality reflects many factors, including high rates of childhood immunization, and strong government commitment to malaria prevention and control, and to the Integrated Management of Childhood Illness (IMCI) (6, 7).

In spite of efforts to reduce the magnitude and consequences of childhood diarrhoea, the disease remains a significant cause of morbidity and mortality among Tanzanian children and is likely to be an important contributor to the high rates of childhood stunting and wasting. Based on the Ministry of Health and Social Welfare (MOHSW) National Health System Report in 2000, diarrhoea ranks third as a cause for out-patient visits (>300,000 consultations/yr), fifth as a cause of hospitalizations (~13,000 cases/year), and fifth as a cause of mortality under five years of age (~11,150 deaths based on 5% of an estimated 223,000 <5yr deaths/year). The 2004-05 TDHS found that 13% of children had diarrhoea during the previous two weeks, 47% were taken to a health care provider, 96% knew about sachets of oral rehydration salts (ORS), 54% were given ORS, 70% received some form of oral rehydration therapy, and 40% received syrups or tablets of some sort (1). Only 36% were given more fluids than usual, as recommended.

In the 2006 Tanzanian Service Provision Assessment (TSPA), assessment and treatment of 347 children with either 1) severe or persistent diarrhoea or dysentery, or any dehydration, or 2) other non-severe diarrhoea was evaluated (8). ORS was prescribed for 63% of children in the first category, and 78% in the second category (8). Overall, Tanzania has higher rates of ORS use than most other African countries (2), but there is room for improvement. Three in 5 children in each category were prescribed antibiotics. Antibiotics appear to be over-prescribed, which may contribute to antimicrobial resistance.

## **Zinc for childhood diarrhoea**

The benefits of zinc as a therapy for acute and persistent diarrhoea have been confirmed through numerous studies. The Zinc Investigators' Collaborative Group reported a pooled analysis of 7 published and unpublished studies in children under 5 years old (9). Children with acute diarrhoea had a 15% (95% CI: 5-24%) lower probability of continuing the episode of diarrhoea if treated with zinc vs. placebo. Children with persistent (>14 days at the time of treatment) diarrhoea had a 24% (95% CI: 9-37%) lower probability of continuing the episode of diarrhoea if treated with zinc than with placebo. Children with persistent diarrhoea treated with zinc had a 42% lower rate of treatment failure or death than children given placebo (95%CI: 10- 63%). Although studies have been done with various supplementation doses (1-4 times the RDA), the data best support a 20 mg per/day dose as both safe and efficacious for children six months and older (10).

Baqui et al implemented a community-based trial of zinc for diarrhoea in Bangladesh. Thirty health worker areas were randomly allocated to a zinc intervention or to a comparison group. Children aged 3-59 months either received 20mg zinc tablets to be taken daily for 14 days plus ORS (intervention) or ORS alone (comparison) when mothers sought care for diarrhoea. The duration of all diarrhoeal episodes decreased by 23% (95% CI 14-31%) and prevalence of all diarrhoea by 15% (95% CI: 4-24%) among the children living in zinc clusters. Non-injury child mortality was significantly lower in those clusters receiving zinc as a treatment for diarrhoea (11). Finally, zinc was associated with lower rates of antibiotic use for non-complicated diarrhoea (4).

Zinc supplementation has been shown to decrease the incidence of diarrhoea. The Zinc Investigators' Collaborative Group reviewed 10 randomized controlled trials of zinc supplementation with active household morbidity surveillance (9). They reported an 18% (95% CI: 7 - 28%) lower incidence of diarrhoea in the zinc-supplemented vs. zinc-unsupplemented children. A randomized controlled trial in Bangladesh assessed the incidence of diarrhoea in

12-35 month old children. Incidence of diarrhoea was lower in the zinc supplemented groups (RR 0.89, 95%CI: 0.79 - 0.99) (12).

In May 2004, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) issued new recommendations for the management of all episodes of childhood diarrhoea including new low osmolarity Oral Rehydration Salts (ORS) and zinc supplementation for 10-14 days (3). When properly deployed, these two advances in treatment will decrease morbidity and enable further reductions in diarrhoea mortality.

### **Service delivery strategies for zinc and ORS**

As Tanzania considers how to introduce zinc and low-osmolarity ORS and obtain high coverage in isolated rural areas and among the urban poor, operational issues must be examined at the country level such as: optimal packaging of zinc and ORS, the impact of zinc introduction on ORT and antibiotic use (4); compliance with a 10 to 14 day course of treatment (5); and coverage obtained and cost-effectiveness of different service delivery modalities such as health facilities, village health workers (VHWs), and private sector providers and pharmacies including Accredited Drug Dispensing Outlets (ADDOs) established under the Strategies for Enhancing Access to Medicines (SEAM) Program; and the effectiveness of different behaviour change strategies for promotion of zinc and ORS. Management of childhood illness by VHWs could lessen many of the financial and logistical barriers that may prevent families from seeking appropriate care for sick children, and will be an effective way of making zinc and ORS available in many settings (13, 14). In Tanzania, private sector providers include private clinics, pharmacies, and ADDO outlets. Intervention models for the private sector warranting further research include social marketing of branded products, communication about zinc and ORS to private sector providers through pharmaceutical company sales representatives (currently being assessed in Bangladesh), negotiation with private sector providers to modify harmful practices (15), and vendor-to-vendor communication of messages (16).

## **Objectives of this study**

Recent work by the POUZN project and on-going advocacy by the A2Z micronutrient project, Helen Keller International, WHO, UNICEF, the Tanzanian Paediatric Association, Johns Hopkins University, the Zinc Task Force and other partners created a favourable environment for formative research on introduction of zinc for diarrhoea. Formative research was needed because 1) zinc treatment involves introducing a new product and therefore requires health providers' adoption and "consumer" acceptability testing and consumer perception of product, 2) maximizing the opportunity to "reinvigorate" ORS use with zinc requires examining perceptions of both ORS and zinc tablets as treatment, reasons for treatment/non-treatment seeking, ORS use and non-ORS use; 3) there is a need to examine use of treatments non-recommended for uncomplicated diarrhoea, terminology/brands, sources, costs, perceptions of effectiveness as a basis for developing messages, counselling guidelines and related job aids. The objectives of the formative research were:

- 1. Local Knowledge of Diarrhoea and Treatment:** To elicit local terminology for diarrhoeal illnesses and the perceived causes and seriousness of diarrhoeal illness; describe sources of care for diarrhoea and common remedies used to treat diarrhoeal illness; and examine treatment practices of childhood diarrhoea in the home, including non-recommended treatments.
- 2. Treatment Seeking Behaviours:** To examine reasons that lead caretakers of children with diarrhoea seek treatment from different sources outside of the home, as well as to examine factors that inhibit parents from seeking outside care.
- 3. ORS and Zinc:** To characterize current use and efforts to promote ORS sachets in the community; to examine perceptions of ORS and zinc tablets as treatment of diarrhoea among families, community (public and private sector) and facility-based health workers; to develop and pre-test messages, counselling guidelines and job aids to promote proper treatment of diarrhoea with ORS and zinc.

**4. Village health workers:** To define the specific role that village health workers (VHWs) currently play in the biannual vitamin A campaign and deworming intervention activities, and define roles they could play in introduction of zinc for diarrhoea in rural areas; identify factors that motivate and cause attrition for VHWs; and examine the roles of VHWs in their communities.

## Methods

### Data collection methods

The study employed a variety of qualitative methods:

- Method 1: Illness narratives with parents of children with diarrhoea
- Method 2: Semi-structured interviews with parents of children with diarrhoea
- Method 3: Semi-structured interviews with Village Health Workers (Mhudumu wa afya kijijini), owners of drug shops (duka la dawa) or other private sector providers
- Method 4: Semi-structured interviews with health workers and programme managers about the Village Health Worker (VHW) programme
- Method 5: Semi-structured interviews with facility-based health workers
- Method 6: Direct observations of facility-based and community-based workers

**Method 1:** Interview with parents of children with diarrhoea presenting to community-based workers, primary health centres, NGO-run clinics, private clinics, or treating the child at home only. Interview may be initiated at health facility, but most of interview took place several days later in the home. First a narrative of the entire illness episode was elicited with minimal probing including perceived cause(s) of diarrhoea then the interviewer probed about treatments given at home, reasons for deciding to seek care outside the home and decision-making process including the chronological order of seeking care, satisfaction with treatments prescribed, perceptions of traditional treatments, and amounts spent on transport, fees and medications.

**Method 2:** This was a continuation of method #1, again with parents of children with diarrhoea, but switching to a semi-structured format with questions on sources of care consulted for sick children, perceptions of different sources of care, free-listing of treatments for diarrhoea, free-listing of reasons to seek care outside the home, characteristics of different treatments for diarrhoea, comparison of the relative effectiveness of different treatments, and cost and side effects of different treatments, sources of information about child health, presentation and tasting of zinc tablets, perceptions of zinc tablets, perceived benefits and disadvantages of the tablets.

**Method 3:** Interviews were conducted with Village Health Workers (*Mhudumu wa afya kijijini*), owners of drug shops (*duka la dawa*) or other private sector providers on knowledge of diarrhoea in young children and its management and treatment, messages given about ORS, how often they give/sell ORS, perceptions of ORS, antidiarrhoeals, and antibiotics as treatments, presentation and tasting of zinc tablets, perceptions of zinc tablets, perceived benefits and disadvantages of the tablets.

**Method 4:** Interviews were conducted with health workers and programme managers about the Village Health Worker (VHW) programme, the present role of VHWs in the Tanzanian health system and VHW motivation for continuing to work within their communities. Currently, the attitude and perception of community members toward VHWs are not well understood, and are crucial for ensuring the sustainability and overall success of this and similar community-based interventions in Tanzania.

**Method 5:** Interviews were conducted with facility-based health workers at MOH and NGO-run health centres and dispensaries on treatment practices for diarrhoea in the facility, perceptions of treatment practices for diarrhoea in the community, suggestions for promotion of rational use of drugs and decreasing antibiotic use, presentation and tasting of zinc tablets, perceptions of zinc tablets, perceived benefits and disadvantages of the tablets.

**Method 6:** Direct observations were conducted at MOH and NGO-run health centres and dispensaries to observe healthcare provider-caretaker interaction with regard to the quality of advice given for diarrhoea management.

### **Training of interviewers**

The objective of the training and pre-test was to impart appropriate knowledge and skills of interviewing for the purpose of meeting the goal of zinc formative research. Three experienced field workers were identified three months earlier prior to commencement of the field activities. The training was held at Vocational Training Centre (VETA) – Morogoro. Facilitation of the training was done by three senior research scientists from Ifakara Health Research and Development Centre (IHRDC), Social scientist from Helen Keller International (Dar es Salaam office) and a paediatrician from the office of Morogoro regional hospital. There was one week of training in the class, followed by one week pre-testing of the interview guides. The training commenced on Tuesday 22<sup>nd</sup> to 29<sup>th</sup> May after which a one week field pre test followed from 31<sup>st</sup> to 7<sup>th</sup> June 2007. After pre-testing, experiences and lessons learned were incorporated to improve the study tools.

### **Site selection**

The study sites were in Morogoro Rural and Kongwa Districts. Considerations in choice of study districts for this formative research included

- The ability to examine how best to integrate zinc treatment for diarrhoea into Tanzania’s existing IMCI strategy,
- How to introduce zinc treatment for diarrhoea in parts of Tanzania that are subject to drought, and have both low population densities and higher levels of under-five mortality,
- Sites where there is already good local capacity for conducting field research.

Morogoro Rural and Kongwa Districts are both sites where there was good local capacity for conducting field research. The former was of interest due to its links to the national IMCI program and potential for examining how best to integrate zinc treatment for diarrhoea into the national IMCI strategy. Results of previous research by the Ifakara Centre conducted as part of the Multi-Country Evaluation of IMCI resulted in the Government of Tanzania making a clear commitment to implementation of IMCI throughout the country. The latter site was more representative of low-density areas with high rates of under-five mortality and diarrhoea-

specific mortality, areas where the greatest mortality impact from introduction of zinc might be expected.

Within the districts, selection of health facilities (HF) and communities to be included was based primarily on health facility records and advice from the offices of the District Medical Officers (DMOs). The DMOs were briefed on the objectives of the zinc formative research and a joint HF selection was made based on areas where many cases of diarrhoea were reported. Health facilities in these areas were selected and the communities within the catchment areas of these facilities were targeted for community interviews. In Morogoro, Ngerengere village, which is about 100 kilometres from Morogoro town and off the Dar es Salaam road, was selected for actual field work for reasons that the village has a health centre that serves five villages. Some villages have no health facilities at all. Diarrhoea is among the top ten diseases in the zone. The village has a large mixed population composed of several different ethnic groups. Ngerengere village where the health centre is situated represents conditions in a small, rural town.. In Kongwa, two villages were selected, Mahutya, which has no a health facility and is far from the available health facility in the ward and Ibwaga where there is a health facility.

## Interviews conducted

A total of 108 interviews were conducted accounting to about 96% of the targeted number of interviews (113). Fifty nine interviews were conducted in Morogoro (Ngerengere) and 49 were conducted in Kongwa.

**Table 1 Interviews conducted by methods and by districts**

Type of interviews	Morogoro		Kongwa		Total Achieved
	Planned	Achieved	Planned	Achieved	
Method 1. Narrative interviews (#1) with parents of children with diarrhoea	5	8	5	7	15
Method 2. Semi-structured interviews (#2) with parents of children with diarrhoea	10	10	10	5	15
Method 3. Semi-structured interviews with community-based and private sector providers	15	14	15	13	27
Method 4. Semi-structured interviews on the Village Health Worker Programme	20	20	20	18	38
Method 5. Interviews with facility-based health workers	2	2	2	2	4
Method 6. Direct observations of community-based and facility-based workers	5	5	4	4	9
<b>Total</b>	<b>57</b>	<b>59</b>	<b>56</b>	<b>49</b>	<b>108</b>

**Table 2**      **Types of Interviews by Methods**

	Planned	Achieved	Missed
<b>Method 1. Narrative interviews (#1) with parents of children with diarrhoea</b>			
Parents of children with diarrhoea treating the child at home only	3	5	+2
Parents of children with diarrhoea presenting at traditional healers	2	1	1
Parents of children with diarrhoea presenting at village health workers, drug shops and other private providers	2	4	+2
Parents of children with diarrhoea presenting at dispensaries or health centres	3	5	+2
<b>Method 2. Semi-structured interviews (#2) with parents of children with diarrhoea</b>			
Parents of children with diarrhoea treating the child at home only	5	5	0
Parents of children with diarrhoea presenting at drug shops (duka la dawa) or other private sector providers	10	4	6 <sup>1</sup>
Parents of children with diarrhoea presenting at dispensaries or health centres	5	6	+1
<b>Method 3. Semi-structured interviews with community-based and private sector providers</b>			
Village health workers	10	8	2
People who work in drug shops	10	9	1
Traditional healers	10	10	0
<b>Method 4. Semi-structured interviews on the Village Health Worker Programme</b>			
Village Health Workers	10	8	2
Mothers of children less than 5 years who participated in the most recent Vitamin A campaign	10	10	0
Mothers of children who sought treatment in the past month for their children's diarrhoeal illness	10	10	0
Traditional Healers	5	5	0
Government facility-based health workers	5	5	0
<b>Method 5. Interviews with facility-based health workers</b>			
Nurses or other health workers in dispensaries or health centres	4	4	0
<b>Method 6. Direct observations of community-based and facility-based workers</b>			
Traditional healers	3	3	0
Village health workers	3	3	0
Health facility workers	3	3	0

## Results: Local terminology, treatment practices and careseeking

### Symptoms and causes of diarrhoea, terminology for types of diarrhoea

In this section of the results we discuss how families label episodes of diarrhoea, manage the illness and decide what treatments to give. The main symptom of diarrhoea illness, according

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<sup>1</sup> Drug shopkeepers could not be able to remember/identify customers with such cases

to the interviews, is the type of stool that a child defecates. The type of stool in turn affects the type of diarrhoea parents think the child has, what they think caused the diarrhoea, and what they think the best treatment would be. A watery stool/soft stool is always the first indication of diarrhoea. The perceived type of diarrhoea is based both on type of stool, other symptoms present and the perceived cause. Associated symptoms that parents pay attention to are yellowish stool, stool that contains fats and/or mucus, loss of appetite, increase in frequency of defecation (more than 4 times a day), abdominal discomfort and child's inability to breastfeed. In a prolonged situation of diarrhoea, a child might have sunken eyes, sunken anterior fontanel, 'loss of water in the body' (dehydration) and in some cases fever, vomiting, paleness and lethargy. Parents state that whitish watery stool indicates that the diarrhoea was caused by cholera (*kipindupindu*). These symptoms were similar in both study districts.

Parents state that some causes are causes of diarrhoea in general, regardless of the type. We call these general causes here. The general causes include eating of *dirty and cold food*, malaria, drinking of dirty/non boiled water and cholera. Other causes are only for one specific type of diarrhoea, which we call specific causes here. An example of a specific cause is the mother having sexual relations and becoming pregnant while still breastfeeding, leading to an illness, described by informants in Morogoro Rural District only, called *kubemenda*. A similar condition in Kongwa District is called *kumtima*.

*"A child might develop diarrhoea because you have become pregnant while s/he was still breastfeeding (this is called kubemenda). When this happens, you are obliged to consult a traditional healer so that the child can be provided with protective medicines".*

Mother of a child with diarrhoea seeking care  
from a traditional healer in Morogoro

Classification of diarrhoea is mainly based on type of stool and the perceived causes of the particular diarrhoea. While Table 3 provides local terms (in Swahili and local languages) used to describe different forms of diarrhoea, Table 4 summarizes types of diarrhoea based on local classifications and their respective perceived causes and symptoms. Of all the types of diarrhoea, cholera (*kipindupindu*) is the most feared and most likely to provoke care seeking at health facilities. Rarely are cholera cases thought to be treatable at home or by traditional healers. One exception are cases when it is combined with specific types of diarrhoea such as

*kuharisha ziwa*, literally milk-diarrhoea, thought to be caused by the infant receiving dirty milk from its mother. Parents distinguish the two types of diarrhoea by frequency of defecation, cholera being characterised by more frequent defecation according to informants.

*“A child might develop watery diarrhoea, another child might have diarrhoea with blood or diarrhoea with greenish stool or yellowish stool or whitish stool like cholera ... so there are different types of diarrhoea.”*

Mother of child with diarrhoea treating child from home in Kongwa

**Table 3 Local terms for different types of diarrhoea**

District	Local term	Approximate English translation
<b>Both</b>	Kuharisha ziwa	Milk diarrhoea
	Kipindupindu	Cholera
<b>Morogoro rural and Kongwa district</b>	Kuharisha malendalenda	Mucous diarrhoea
	Kuharisha kwa malaria	Diarrhoea due to malaria
	Kuharisha kwa kukua / kutambaa	Diarrhoea when infant is growing, and/or starts walking
<b>Morogoro rural district only</b>	Kuharisha kawaida	Normal/routine diarrhoea
	Kuharisha damu	Bloody diarrhoea
	Kuharisha mafuta	Oily diarrhoea
	Kubemenda	Diarrhoea when breastfeeding mother has sex, becomes pregnant
	Nzasa	Diarrhoea with watery, yellowish stool
<b>Kongwa district only</b>	Kikwamba	Diarrhoea w yellow stool and string-like structures
	Kifamba	No equivalent term
	Kumtima	No equivalent term
	Chiwino chakulamidza	Anus protrusion
	Mahungwi	No equivalent term
	Ngiri	‘Warthog’, Inguinal hernia
	Kuharisha wekundu/damu	Bloody diarrhoea
	Kuharisha kwa kuota meno ya plastiki	Teething diarrhoea, diarrhoea from plastic teeth
Kuharisha kwa chronic	Chronic diarrhoea	

**Table 4** Types of diarrhoea, perceived causes, symptoms and treatment

SN	Type of diarrhoea	Perceived cause	Symptoms	Treatment ( <i>arranged by order of administration</i> )
1	Normal diarrhoea <i>Kuharisha kawaida</i>	Malaria	Fever, vomiting, soft stool	ORS, antimalarials, herbs
2	Cholera <i>Kipindupindu</i>	Dirty food/water	White stool	Antibiotics and ORS from hospital, herbs
3	Dysentery <i>Kuharisha damu</i>		Stool with blood	Antibiotics from drug shops or HF and herbs
	Mucus diarrhoea <i>Kuharisha malendalenda</i>		Stool with mucus	Antibiotics from drug shops and herbs
4	Diarrhoeal due to growth <i>Kuharisha kwa kukua</i>	Growth (teething and crippling)	Soft yellowish stool	Herbs
5	<i>Kuharisha mafuta</i>		Stool with fats	Herbs and antibiotics
6	<i>Kubemenda</i> (A stigmatised condition)	Having sex while breastfeeding	Frequent defecation of soft stool with child becoming weak and emaciated	Herbs
7	Milk diarrhoea <i>Kuharisha ziwa</i>	Dirty milk from mother	Milk like stool	Herbs
8	<i>Nzasa</i>		Watery yellowish stool	Herbs
9	<i>Kikwamba</i>		Yellowish stool with string like structures	Herbs
11	<i>Kumtima</i>	Mother becoming pregnant while breastfeeding		Herbs for both mother and child
12	<i>Chiwino Chikulamidza</i>		Anus protrusion	Herbs
13	<i>Mahungwi</i>		Greenish stool	Herbs
14	Plastic teeth diarrhoea		Due to " <i>plastic teeth</i> "	Extraction of plastic teeth and herbs
14	Hernia <i>Ngiri</i>		Yellowish stool with abdominal discomfort	Herbs and hospital
15	Chronic diarrhoea <i>Kuharisha kwa chronic</i>		Prolonged diarrhoea despite treatment especially after hospital treatment failure	Herbs

## Modern treatments for diarrhoea

There are two broad categories of treatment depending mainly on the perceived cause of diarrhoea. These are “modern” treatments and traditional herbs and other traditional practices. The category of “modern” treatment is further divided into two sub-categories, self treatment with modern medicines and health facility-based treatment: Both include use of a broad range of antibiotics, antimalarials, home made solutions and ORS.

The antibiotics commonly used include Flagyl (Metronidazole), Erythromycin syrup, Doxycycline syrup, Amoxicillin syrup and Septrin (Cotrimoxazole) syrup. Tetracycline was specifically mentioned as a treatment for cholera. In Morogoro, Erythromycin and Septrin were used to treat “*chronic diarrhoea*” while Flagyl was used for “*normal diarrhoea*”. Mist Kaolin and Belladonna were also mentioned to be used to treat diarrhoea. Artemether Lumefantrine (ALu) was mentioned to be used to treat diarrhoea caused by malaria. Most of these antibiotics are obtained more from drug shops, which are actually not allowed to sell antibiotics<sup>1</sup>, rather than from health facilities. Stock outs of antibiotics in health facilities were commonly reported by majority of mothers interviewed.

*“After seeing that my child had developed diarrhoea, the first thing that I did was to give him Flagyl tablets that I had with me at home. Then I took him to hospital where he was also attended very well....they provided him with ALu, Flagyl, erythromycin and paracetamol.”*

A single mother of a child with diarrhoea seeking care from a health facility in Ngerengere

*“When a child develops diarrhoea we usually prescribe for vitamin A, ORS and antibiotics .... The common antibiotics we prescribe include septrin and metronidazole.”*

Clinical officer in one of health facilities in Kongwa

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<sup>1</sup> Sometimes, it was difficult to contact drug shop dealers as they would always hide away from our research assistants for fear of being caught selling antibiotics without authorization

Interviews with health providers revealed that the high and uncontrolled use of antibiotics to treat diarrhoea is favoured by several factors. Table 5 below summarizes some reasons that lead people to use or avoid using antibiotics.

**Table 5 Reasons people use or avoid using antibiotics**

Reasons leading people to use antibiotics	Reasons leading people to not use antibiotics
<ul style="list-style-type: none"> <li>▪ Easily available especially in drug shops or kiosks</li> <li>▪ Over-prescription of antibiotics by health providers</li> <li>▪ Belief in antibiotics as ‘drug of many ailments’</li> <li>▪ Some types of antibiotics are sold cheaply</li> <li>▪ High rates of self treatment/medication (treatment without consulting health providers)</li> <li>▪ Tendency of drug shopkeeper selling antibiotics without a prescription</li> <li>▪ Tendency of drug shopkeepers selling antibiotics not necessarily as a complete dose but rather in instalment</li> <li>▪ Strong belief among people on effectiveness of antibiotics to cure ailments</li> <li>▪ Weak mechanism to enforce government regulations on use of antibiotics at different level of health care provision</li> <li>▪ Lack of any popularly known campaign emphasizing rational use of antibiotics</li> </ul>	<ul style="list-style-type: none"> <li>▪ Government laws and regulations do not allowing some types of antibiotics at different levels, for example drug shops are not supposed to sell antibiotics</li> <li>▪ Limited knowledge among some villagers about antibiotics and hence fear of the unknown in using them</li> <li>▪ Some types of antibiotics are very expensive and thus unaffordable to many people</li> <li>▪ Stock out of antibiotics in public health facilities</li> </ul>

The use of ORS is common and popular and **all mothers** interviewed in this study knew about ORS and its effectiveness for diarrhoea. It is available free of charge from health facilities and when bought from drug shops, it costs between Tshs 200 and 250 (US\$ 0.2 and 0.25).

### **Traditional treatments for diarrhoea**

Table 6 below summarizes some traditional practices/treatments for diarrhoea as documented in the course of this study. It was reported that *Mchosi* (which is a tree whose tubers/roots are boiled and the liquid given to a patient) is used to treat diarrhoea called *Mahungwi*. Tubers/roots from *Mtindilihara* when boiled, is used to treat dysentery and any diarrhoea with yellow stool. Other trees like *Masaka* and *Msechelela* were reported to be used to treat any form of diarrhoea. Also, *Mhunungu* and *Mgama* were reported to treat diarrhoea called

*Kifamba*. Leaves from *Mpera* (guava) and *Mwarobaini* (neem) are used to treat any kind of diarrhoea including cholera. Fish oil, *Msigi*, *Kikulagembe*, leaves from *Mkwaju* (Tamarind) and *Mpingo* (ebony) are also used to treat any kind of diarrhoea. *Mfumbasi* was said to be used to treat diarrhoea due to “dirtied milk” (kubemenda).

“My child had diarrhoea, every time I took her to hospital the diarrhoea tended to reoccur. I had to ask my grandmother as to what I could do. She asked me to describe the type of stool and I told her it was yellowish with some string like things. She then asked me if I ever fed my child with pumpkins and I said yes. She told me that it was wrong to feed small children in our clan with pumpkins. She told me that I was supposed to boil the pumpkin flower and eat myself first before feeding the child with pumpkin. She then instructed me to do so, and since I did that, the recurrent diarrhoea episodes to my child stopped”.

Mother of child with diarrhoea treating child from home in Morogoro

**Table 6 Traditional medicines and practices used to treat different types of diarrhoea**

Morogoro rural district		Kongwa district	
Type of diarrhoea: Local term and translation	Traditional medicines	Type of diarrhoea: Local term and translation	Traditional medicines
<i>Kuharisha ziwa</i> Milk-diarrhoea	Liquid from guava <sup>7</sup> or neem leaves	<i>Kumtima</i> (No translation)	Liquid from <i>Masaka</i> tree leaves or roots
<i>Kuharisha kawaida</i> Normal/routine diarrhoea	Liquid from guava or neem leaves	<i>Chiwino chakulamidza</i> Anal protrusion	Liquid from boiled roots of ebony tree
<i>Kipindupindu</i> Cholera	None	<i>Mahungwi</i> (No translation)	Tubers/roots from <i>Mchoshi</i> tree are boiled and the liquid given to a patient
<i>Kuharisha damu</i> Bloody diarrhoea	Liquid from tamarind tree leaves	<i>Ngiri</i> Hernia/protrusion	Liquid from neem leaves

<sup>7</sup> Liquid made from guava, neem and tamarind tree leaves were used to treat a broad range of diarrhoea in both districts.

Morogoro rural district		Kongwa district	
Type of diarrhoea: Local term and translation	Traditional medicines	Type of diarrhoea: Local term and translation	Traditional medicines
<i>Kuharisha malendalenda</i> Mucous diarrhoea	Fish oil, Msigi, Kikulagembe	<i>Kuharisha ziwa</i> Milk diarrhoea	Liquid from boiled roots or leaves of <i>Msechelela</i> tree
<i>Kuharisha mafuta</i> Oily diarrhoea	Fish oil, tamarind	<i>Kuharisha kwa kutambaa</i> Diarrhoea from walking	
<i>Kuharisha kwa kukua/kutambaa</i> Diarrhoea from growing/walking	Liquid from pumpkin leaves	<i>Kuharisha wekundu/damu</i> Bloody diarrhoea	Liquid from leaves of <i>Mtindilihara</i> tree
<i>Kubemenda</i>	<i>Mfumbasi</i>	<i>Kuharisha kwa kuota meno ya plastiki</i> Teething diarrhoea	Uprooting of plastic teeth
<i>Nzasa</i>	Liquid from guava or neem leaves	<i>Kipindupindu</i> Cholera	None
<i>Kikwamba</i>	<i>Mgama</i> tree leaves	<i>Kuharisha malendalenda</i> Mucous diarrhoea	Liquid from neem or guava tree leaves
<i>Kifamba</i> <i>Kuharisha kwa malaria</i>	<i>Mhunungu</i> tree leaves	<i>Kuharisha kwa chronic</i> Chronic diarrhoea <i>Kuharisha kwa malaria</i> Diarrhoea due to malaria	Liquid from neem tree leaves

### Treatment seeking behaviours

There was no notable or significant difference in health seeking behaviours between the two districts. Two factors were common across the two districts in determining care seeking when a child experiences diarrhoea: distance from health facility and perceived severity of the diarrhoea illness. Parents who live close to a health facility will, in most cases, start seeking care from health facilities and if the diarrhoea persists they will use herbs and/or consult traditional healers. If the diarrhoea is considered severe, parents tend to seek care from health facilities regardless of the distance. In both cases, prior efforts are made to treat the diarrhoea first from home with left over medicines or to purchase medicines from shops. As part of home management of diarrhea, herbs might be provided by knowledgeable parents or after receiving

advice from neighbours, friends or other relatives. Sometimes, parents would start with administering solutions of sugar, salt and water before consulting a drug shop dealer, a village health worker or a health worker at a health facility. In communities where the village health workers are active, they are usually consulted for advice and they are the ones who teach parents how to prepare the solutions. In general, for a prolonged diarrhoea episode, at least three steps on care seeking will be followed (Figure 1).

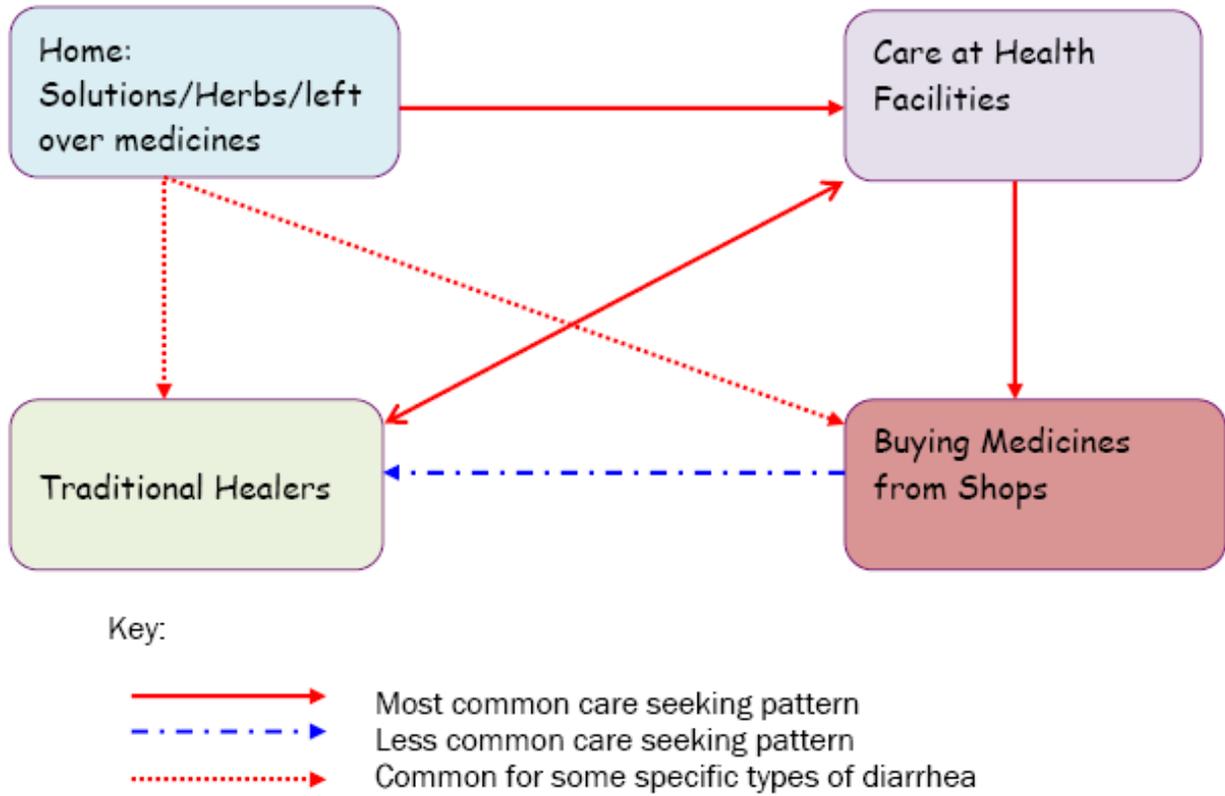
*“Mh! There are those parents who usually start seeking care from traditional healers and there are those who start by buying medicines from drug shops and others who would do nothing hoping that the child will just recover”.*

Health Officer, Kongwa

*“Some people would start taking their children to hospital first and when they fail to get recovery, they would turn to us...traditional healers.”*

Traditional healer, Morogoro

The decision to consult a traditional healer or give herbs is always influenced by the perceived type of diarrhoea (Table 4). Types of diarrhoea such as *kuharisha ziwa* or *diarrhoea due to plastic teeth* are usually not taken to health facilities. Table 7 below presents various factors affecting care seeking behaviours in the studied communities. Treatment of diarrhoea with herbal medicine is widespread. In most cases, herbal medicine is accessed based on the knowledge of household members, without consulting a traditional healer. Traditional healers are typically consulted when the diarrhoea either is more severe, or is a type that traditional healers are thought to possess the specific skills and experience needed to treat it successfully. Village health workers do not appear in Figure 1 because they are a source of counselling, not a source of treatment. While similar cadres of community workers manage and treat sick children in other countries in Asia, Africa and Latin America, in Tanzania their role is restricted to health promotion.



**Figure 1.** Care seeking patterns for diarrhoea illnesses

**Table 7 Factors affecting care seeking**

Factors	Description (and illustrative quote)
Severity of the diarrhoea episode	<p>When perceived to be severe, care is sought from health facility regardless of distance</p> <p><i>“Eeh, you just observe the severity of the diarrhoea, if it is not too bad then God might help you without going to hospital or even going to a drug shop...just at home and God helps you your child gets recovery.”</i></p> <p>Mother of a child with diarrhoea treating the child at home (Kongwa)</p>
Distance	<p>Might delay seeking care from health facility if too far</p> <p><i>“I came to the village health worker because we are usually advised to consult them when we face health problems before going to hospital. That’s why I came to her to seek her advice on my child illness...and she agreed to go with me to my home to see the child.”</i></p> <p>Mother of child with diarrhoea presenting at a village health workers (Morogoro)</p>
Type of diarrhoea	<p>This will always lead to treatment at home or to a traditional healer or to a health facility – See types of diarrhoea treated with traditional treatments in Table 6 above</p>
Cost	<p>In Tanzania, children under five are not charged when seeking care from public health facilities. However indirect costs such as buying an exercise book (a book like a notebook) used for the health worker to write the prescription, travel expenses if the health facility is situated far away have an implication to decision on care seeking</p> <p><i>“It happened when I was really in a bad shape. I had no even a single cent. And then I said, if I go to hospital without money what will happen? Then I said, let me try these (herbs) perhaps they will help my child and thank God they did.”</i></p> <p>Mother of child with diarrhoea treating the child at home (Morogoro)</p>
Availability of left over medicines from previous episode	<p>This favours home treatment with formal medicines depending on perceived severity and type of diarrhoea</p> <p><i>“If the diarrhoea started at night you will have to use herbs but when you find that the condition becomes worse you will have to go to hospital to seek help”.</i></p> <p>Mother of child with diarrhoea treating the child at home (Kongwa)</p>
Presence at home or closeby of someone with knowledge of traditional herbs	<p>This favours home treatment with traditional medicines depending on perceived severity and type of diarrhoea</p>
Decision making at household level	<p>Young mothers are usually instructed by the elders (grandmothers, aunts, in-laws etc) on what do when a child suffers from an illness</p> <p><i>“The condition of my child worsened and we were just at home doing nothing. Then I pleaded with my husband to take the child to hospital showing him the child’s clinic card which indicated poor health development. He agreed but he asked me to start first consulting the village health worker prior to going to hospital.”</i></p> <p>Mother of child who participated in the most recent vitamin a campaign (Morogoro)</p>
Presence/activity level of village health worker	<p>Active VHWs are often consulted before proceeding to a health facility.</p> <p><i>“There is my neighbour whom I use to consult when I have problems. When my child developed diarrhoea, I consulted her and she advised me to seek advice from the village health worker. I left my child with my neighbour and contacted the village health worker who agreed to come with me to my home to see my child”.</i></p> <p>Mother of child who participated in the most recent vitamin a campaign (Kongwa)</p>

## Administration of ORS and zinc

There is a very high use of ORS in both districts. ORS sachets are popularly known as *Maoro* or *Mapakiti* and commonly used both at household level and in health facilities. ORS is freely available from public health facilities and when bought from shops a sachet is sold at Tshs 200 or 250 (≈US\$ 0.2 or 0.25) per sachet which is generally affordable. Out of 20 mothers of children with diarrhoea interviewed, 15 (75%) said that ORS helps to bring back energy to a patient quickly. They also believe that it helps stop diarrhoea, but do not see it as a complete cure for diarrhoea. Patients are usually dissatisfied if provided with ORS alone without antibiotics. Table 8 below summarizes reasons that promote and hinder use of ORS from the community's point of view.

**Table 8 Facilitators and constraints towards use of ORS**

Facilitators	Constraints
<ul style="list-style-type: none"> <li>▪ Belief among caretakers that ORS gives back energy quickly</li> <li>▪ Available free of charge in public health facilities or at a low price at points where ORS are sold</li> <li>▪ Easy to prepare</li> <li>▪ No fear of over dosage</li> <li>▪ Belief that ORS helps to initiate process of stopping diarrhoea</li> </ul>	<ul style="list-style-type: none"> <li>▪ The taste of ORS is not very much favoured</li> <li>▪ Belief that ORS alone are not a sufficient treatment for diarrhoea</li> <li>▪ Storage of prepared ORS is not strictly adhered and sometimes overnight solutions are not discarded</li> </ul>

The use of zinc as treatment of diarrhoea was unfamiliar to almost all respondents interviewed. After explanations and demonstration of the zinc tablets, participants were asked for their opinion on colour, size, packaging and dosage of the tablets. Generally, there was a positive attitude toward zinc as treatment for diarrhoea.

*“According to the available information the medicines (zinc tablets) have gone through a thorough research process and definitely are going to be an effective treatment for diarrhoea ... it will compliment the use of ORS and as you said, it will also help to cure small bruises in the stomach – this is a good thing.”*

Health worker (nurse) at a public dispensary (Morogoro)

Of the 108 respondents interviewed, 104 (≈96%) commented on the packaging of the tablets, both the box/carton and the blister. Four participants just hinted without explanations that they liked the tablets.

The packaging was associated with quality and reliability of the medicines in comparison to non blister tablets. The taste of the tablets was very much liked by all participants who were given the tablets to taste during the course of the study. Respondents liked the size of the tablets and felt that it is appropriate for children under five years of age.

There were mixed feelings about the dose and dosage. While some said that there was no problem with the dose and dosage and that it was manageable, more than half of the study participants thought that the number of tablets (10) was too much and the length of the dosage is too long. There were no concerns recorded on colour of the tablets. Of the 4 health care workers and 38 village health workers interviewed, 3 health care workers and all village health workers suggested that outlets for zinc tablets should be health facilities (dispensaries and health centres) as the main outlets but also should be made available from drug shops. One health care worker suggested that, the procedure followed by the National Malaria Control Programme on introduction of Coartem as a new treatment for malaria (which limits the drugs only to public health facilities at least in the first stage of the introduction) should be used in introducing zinc.

There was quite a wide range of prices recommended for zinc tablets; the maximum being Tshs 1000 (US\$ 1) and the minimum is Tshs 200 (US\$ 0.2). However, out of 30 mothers with under fives interviewed, 24 mothers (80%) recommended the tablets to be made available for free. Some participants were concerned that using zinc tablets alone would not address dehydration which is usually associated with diarrhoea. They wanted zinc tablets to be used with ORS. Of course this misgiving is a result of their limited knowledge on the administration of zinc as treatment of diarrhoea, and highlights the need to ensure that the messages given are clear (i.e. that zinc is intended to be used in conjunction with, not as a replacement to, ORS).

*“I would recommend the price for zinc tablets to be not very much different from the prices of other syrup medicines for children...like Tshs 600 or 700 or 800. It will be difficult for many people to afford the tablets if they will be sold at higher prices. I don’t know the cost of producing the tablets but it would have been helpful if they were available at a cheaper price to reach many low income people.”*

Health provider (Kongwa)

*“They (zinc tablets) should not be sold at a high price because this is like a social service to people; there should be a possibility for people to afford to buy them for their sick children otherwise kids will continue to be lost”.*

Health provider (Morogoro)

## **Results: Service delivery strategies and channels of communication**

The main sources of treatment for diarrhoea in the two study sites were government health facilities, drug shops and traditional healers. There were no ADDO outlets in the two study sites, and careseeking from licensed pharmacies was difficult as they were located in towns. Village health workers are a common source of information about diarrhoea, but are not in general a source of treatments for diarrhoea.

### **Observed Communication Channels**

From the observation data as well as from the interviews, common channels for communicating information on diarrhoea and treatment of diarrhoea include posters and interpersonal communication. Posters are popular in health facilities while interpersonal communication is the key communication strategy among VHWs. Little interpersonal communication was observed to be exercised by health facility-based providers and in most cases, such communication was more common by dispensers than by prescribers. The nature of communication was more didactic and data collectors did not observe a single case where a patient was given an opportunity to ask questions. On the contrary, VHWs reported and were observed to entirely rely on interpersonal communication with their clients and to a great extent, it was more of a conversation rather than an instructor-student communication. None of the VHWs was found to be carrying any job aid or information, education and communication (IEC) materials on diarrhoea.

None of the health providers, including VHWs, remembered any radio or TV programme about diarrhoea and diarrhoea treatment. VHWs reported to have learned issues about diarrhoea and its treatment from seminars/workshops and from basic training when they were chosen and

through their constant interactions with health facility-based providers. Similarly, no health facility-based providers, drug shop dealers or VHWs recalled any social marketing activity on diarrhoea and diarrhoea treatment indicating that although social marketing has been popular in Tanzania with certain commodities and other health interventions, it has not been utilized to draw attention to diarrhoea and its treatment.

### **Counselling by facility-based providers**

Quality of counselling in government health facilities is highly problematic. While careseeking from government health facilities was common, their impact on diarrhoea was limited due to the tendency to prescribe antibiotics (see above), and the poor quality of counselling provided to parents of children with diarrhoea. From the observation sessions, it was found that, there is usually little interaction between facility-based providers and their clients compared to the level of interaction between VHWs or traditional healers and their patients. VHWs have sufficient time to talk with clients, enabling them to communicate sufficient information during their home visits, and allowing time for a question and answer session. Alternatively, the traditionally short contact and doctor-dominated communication prevails when health facility-based providers attend their patients. A better communication situation was observed among drug shop dealers when attending their customers. There are always sufficient interactions, instructions and emphasis on the use of the drugs provided to customers by the dealers.

Common messages from health facility-based providers to patients were those related to hygiene and preparation of local oral solutions using salt and sugar using boiled clean water. There were no messages noted from any health facility-based provider visited on types of treatment offered and drugs prescribed. The same messages were reported by VHWs to be provided to patients during home visits. In addition to this, VHWs reported counselling clients on issues such as types of drugs to treat diarrhoea and their side effects, and addressing issues people hear from radio and television about diarrhoea, particularly those associated with HIV/AIDS.

## **Counselling and health promotion by village health workers**

It was found that the roles of VHWs are common across the two districts. They are involved with weighing children during post natal clinics and participate in vaccination and immunization activities (e.g. vitamin A supplementation). VHWs also provide health education to communities and sensitize people on hygiene, cleanliness and sanitation issues. Sometimes, they conduct follow up visits to pregnant women to urge them to attend antenatal clinics. Occasionally they take part in health facility activities such as registration and dispensing due to shortage of staff.

During vitamin A supplementation, village health workers

- Facilitate preparations for the vitamin A supplementation
- Provide vitamin A drops to children
- Fill in RCH cards

When asked what roles they can play with the introduction of zinc as treatment for diarrhoea, VHWs said that they can do similar roles as those done through vitamin A supplementation (e.g. sensitize mothers and community at large on advantages of using zinc as a formal treatment for diarrhoea, importance of compliance to the dosage etc).

*“I am a village health worker and my work is more on the health of under fives. I have seen these (zinc) tablets and I am very impressed. They will be very good for children and they will not find them difficult to administer (swallow). I will be ready to advise parents/caretakers to take their children who have diarrhoea to hospital if these tablets will be available there”.*

VHW (Morogoro)

*“We will be ready to sell the tablets .... Because these medicines will help our children significantly. They will also help to cure bruises in the stomach which usually develop to*

*ulcers at older age. We had usually been wondering why people have ulcers ... so diarrhoea at young age might be one of the causes!”*

VHW (Kongwa)

In order for the village workers to fulfil these roles, they recommended addressing certain factors that hinder their performance. These include a mechanism that will guarantee them with incentives (both financial and non financial incentives) to motivate them, a defined line of accountability (as currently, the village government is less responsible for them) and provision of working tools and other essential facilities (e.g. bicycles, document bags etc). Incentives mentioned included not only money, but also seminars and refresher training on new types of interventions

No episodes of counselling by traditional healers were observed. Traditional healers reported advising some of their patients to consult health facility-based providers for rehydration and or blood transfusion when they perceive their patients to be too dehydrated or very anaemic.

*“For sudden diarrhoea cases, especially among children - but also even among adults, I usually provide them with juice made from guava leaves. Normally it cures diarrhoea very fast. However, if the diarrhoea doesn’t stop within the expected period I advise my patient to go to a health facility.”*

A traditional healer in Ngerengere

## **Recommendations: Local terminology, treatment practices and careseeking**

### **Local terminology for diarrhoeal illnesses**

Diarrhoea is not a unitary phenomenon in either study site. What medical and public health specialists consider to be diarrhoea is given many different labels, and attributed to many different causes.

Diarrhoea and malaria: As found in previous research in Mali (17, 18), the boundaries between diarrhoea and malaria are very fluid. Some people see diarrhoea as a symptom of malaria, or

as caused by malaria. It follows that antimalarial treatments are seen as treatments for some forms of diarrhoea. So much as health professionals see diarrhoea and malaria as separate problems, they are linked in several ways at the household and community levels (17, 18).

Therefore malaria prevention control programmes efforts in Tanzania need to address diarrhoea in their messages, and diarrhoea control programmes need to address malaria.

Diarrhoea as a normal part of growth and development: Diarrhoea straddles the boundary between health and illness in many cases. Diarrhoea can be attributed to a growth spurt or teething, rather than to an infectious agent.

Diarrhoea due to causes best addressed by traditional healers: Diarrhoea can be attributed to a number of causes best addressed by traditional healers, such as a breastfeeding mother having sexual relations or becoming pregnant.

Unlike other diseases/illnesses such as malaria and AIDS, relatively little has been done to educate communities on the recommended treatment practices for diarrhoea illnesses in recent years. The majority of participants in the formative research associated some forms of diarrhoea with traditional causes, even in Morogoro Rural District where exposure to IMCI activities has been intense. The Health workers have packaged diarrhoea illnesses in a single package as “diarrhoea” (too generalized) and as a result, people fail to get appropriate details on what they viewed as distinct types of diarrhoea.

#### Potential messages taking account of local terminology for diarrhoea

- When malaria and diarrhoea come together, both need treatment, don't forget to treat the diarrhoea. The best treatment for diarrhoea is zinc plus ORS. Take the malaria treatment, zinc and ORS if your child has fever and diarrhoea.
- Children can get diarrhoea for many reasons, and diarrhoea can come with many illnesses. Whatever the reason, zinc plus ORS helps your child recover more quickly, and prevents dehydration.

## **Antimicrobial use**

This qualitative study demonstrated that there is generally high and frequent use of antimicrobials (antibiotics, antiparasitics etc.) for diarrhoea. This is confirmed by the 2004 Tanzania DHS, which found that pills or syrups were given in 40% of cases of diarrhoea (1). Partly, this use of antimicrobials results from prescription by providers from health facilities, a finding again confirmed by a nation-wide study (8). The study revealed frequent reported stock outs of antimicrobials in public health facilities, which then encourages unauthorized drug shops to stock their shops with antimicrobials and in turn increases the number of people who attempt self medication by buying antimicrobials from drug shops.

Our data do not provide evidence for the effect of introducing zinc for diarrhoea treatment on the current high use of antimicrobials, as has been demonstrated elsewhere (4, 19). However, it is worth arguing that, if zinc will demonstrate good performance and win caretakers confidence in a similar way ORS has done, it will likely reduce both over-prescription and self-administration of antimicrobials significantly. It is worthwhile to recommend such a study, a few years after implementing zinc in the country to see the extent at which use of antimicrobials to treat diarrhoea continues. Data from this study support the assumption that zinc tablets will receive a very positive welcome as an alternative treatment of diarrhoea. In addition, it might help in reducing unnecessary use of antimicrobials among the population. From the interviews, communities have indicated the likelihood of using zinc as an adjunct treatment of diarrhoea but the current use of antimicrobials poses a challenge.

Messages need to be crafted in a manner that encourages zinc and ORS for all types of diarrhoea, and that clearly explain the utility of using the two together. The opportunity to build upon high rates of ORS utilization needs to be seized. The same advantages to using ORS (it's inexpensive, easy to use, safe, and begets results) should be promoted as advantages to using zinc. However, it seems possible that presenting zinc as a formal treatment may help to achieve the shift that needs to occur from the practice of giving ORS plus antimalarials/antimicrobials to sick children to ORS plus zinc. Again, some of the advantages

that make utilization of antimicrobials desirable (easily available, inexpensive, produces good results, no prescription necessary) can be applied to zinc.

The high and irrational use of antimicrobials calls for the Ministry of Health and Social Welfare (MOHSW) in collaboration with the Tanzania Food and Drug Authority (TFDA) to re-examine the existing regulations and guidelines for a better workable strategy. The various factors contributing to high antimicrobial use shown in Table 5 need to be addressed systematically. Additional emphasis is needed in IMCI training on limiting unnecessary use of antimicrobials. This needs to be coupled with promotion of zinc as a preferred treatment for uncomplicated diarrhoea.

#### Potential messages to reduce unnecessary antimicrobial use

- Drugs such as Flagyl and Septrin are not needed for most cases of diarrhoea. Go to the health centre and get zinc and ORS. (There is not a single well-known term in Kiswahili corresponding neatly to antibiotic or antimicrobial. For this reason, messages may need to name specific antibiotics).
- Zinc works quickly, it's easy to give to your child, it's inexpensive, and it's an effective treatment for diarrhoea. Zinc plus ORS is the solution for diarrhoea.
- Zinc and ORS are the most effective treatments for diarrhoea. Zinc helps your child recover more quickly, and regain strength.
- Don't let shopowners and ambulatory vendors convince you that fancy pills and capsules are needed for your child's diarrhoea. Zinc and ORS are the best treatments for diarrhoea.

#### **Compliance with 10 days of zinc for diarrhoea**

Poor compliance might be experienced with the current dosage of zinc tablets particularly if the first few doses will be effective enough to stop diarrhoea. Communities have indicated that the duration of diarrhoea treatment using zinc is long (10 days). The 10-day duration of treatment was perceived as too long to >50% of respondents, therefore, the communication and training strategy should provide specific attention to stressing the safety and importance of complying

to the 10-day treatment protocol. Compliance might be a problem particularly if symptoms disappear. Early strategies to address this problem should be designed simultaneously with the introduction of the therapy. In the early days of zinc introduction into the national programme, particular attention should be paid to issues of compliance, and if/how this affects treatment failure rates as well as perceptions related to zinc as an adjunctive therapy.

#### Potential messages to promote a full ten days of zinc for diarrhoea

- Ten days of zinc for diarrhoea ensures that your child regains strength, and helps protect him/her against future episodes of diarrhoea.
- Give your child the full protection of zinc by giving him/her a full ten days of this new treatment.

#### **Cost and packaging of zinc tablets**

Zinc tablets should fall under the same policy as any other medicines when used for children less than five years of age (i.e. it should be provided free in public and in non-profit health facilities). When stocked in private shops and other sources, it should be made available at a minimum price possible, importantly not more than Tshs 200 but preferably Tshs 100. If the production costs are high, a subsidization strategy should be sought. Measures should be taken to educate both health facility workers and drug shop dealers on the importance of providing/selling zinc with ORS, rather than antimicrobials/antimalarials. A variety of packaging and formulations of zinc were not available for this formative research. Considering how favourably respondents viewed the size, colour and packaging (blister-packed) of the zinc tablets, actual zinc preparations should be similar to those tested unless there are good reasons to do otherwise.

#### **Recommendations: Service delivery strategies and channels of communication**

Strategies to promote zinc and ORS should employ multiple channels of communication, and methods of communicating those messages. Zinc should be available through the channels

through which people currently obtain ORS and antimicrobials to treat children with diarrhoea: health facilities, pharmacies and drug shops.

### **IMCI and quality of care for children with diarrhoea**

One assumption underlying the selection of the two districts was that Morogoro rural district, with the effects of the Tanzania Essential Health Intervention Project (TEHIP), would have a better performance on various health indicators and specifically the Integrated Management of Childhood Illnesses (IMCI) intervention compared to Kongwa district. However, our results show no significant difference in many aspects. In diarrhoea case management for the under five population, as an example, our observation data indicates similar practices by providers in public health facilities. IMCI is not strictly adhered to in Morogoro due to shortage of staff who argued that, with high health facility utilization especially for children less than five years of age, it is difficult to practice IMCI which requires sufficient time per patient. On the other hand, this study was conducted several years after the national roll out of TEHIP interventions nationwide and so diffusion of much of the experiences from TEHIP intervention districts might have occurred and reached Kongwa which in turn is reflected in the little variations observed. In addition, it should be remembered that, apart from district specific experiences, all the districts are also adhering to the national guidelines provided by the Ministry of Health and Social Welfare. These facts should explain the similarities in the two study districts.

Patterns of care seeking in the two districts also demonstrated many similarities. Although health facility utilization was reported to be high, utilization specifically for diarrhoea treatment was low. This is similar to what was reported in the Tanzania DHS report of 2004 -05 where as less than half of sick children (47 percent) were taken to a facility for treatment of diarrhoea (1). The same data indicated that treatment at home is much more common.

Furthermore the observed health seeking behaviour is also attributed by the fact that there had been little community-based interventions and those which are in place are common to both districts. The Community IMCI intervention package, which is being implemented through the

use of Community Owned Resource People (CORPs) has been introduced in both districts (and was expected to result in a reduction in delayed or inappropriate careseeking patterns, but its implementation has been inconsistent and is facing many challenges (20). In the evaluation of Community IMCI conducted in 13 districts of mainland Tanzania, Mbuyita *et al* found that there was a massive attrition of CORPs volunteers in all districts (20). In the absence of a functional cadre of CORPs, effective implementation of the CIMCI strategy will be very difficult. In addition, scaling up of Community IMCI in the country has proceeded slowly, covering only 29 districts at the time of writing.

During the course of this study, it was observed that there were limited interactions between care takers and providers care is sought from health facilities. As a result, a potential opportunity to convey diarrhoea specific messages is missed. The only reliable interpersonal message conveyance remains to be through the village health workers who are increasingly becoming de-motivated. This practice was observed in both districts and it helps to explain the little difference in care seeking behaviours observed.

Insufficient diarrhoea IEC messages in rural areas and in rural facilities has an impact on the observed care seeking behaviour. In fact some of the health facilities visited completely lacked even a single IEC job aid on prevention or treatment of diarrhoea. More effort on community awareness and education on diarrhoea diseases has been observed more during outbreaks of cholera than at any other time. This is problematic, because during cholera outbreaks treatment of cholera with antibiotics sometimes is emphasised, leaving people with the impression that antibiotics should be a routine treatment modality for diarrhoea. Investment is needed in job aids to facilitate inter-personal exchange regarding diarrhoea treatment between patients and health-facility based workers and village health workers.

### **Village health workers**

Results of this study suggest that, for any community-based intervention to be successful, special efforts should be made to train and empower community-owned resource persons –

including village health workers. Many constraints affect this cadre of worker. Similar constraints were observed by a study conducted in Rufiji district on assessment of village health workers as volunteers (21). The importance of this cadre cannot be overemphasized and for sustainability, they need to be integrated in the existing health system or any other administrative structure rather than the current practices of using them only when we need them and forget them when don't have activities. Tanzania is currently standing a better chance of optimizing the use of VHWs as there is a political will supported by the Central Government on officially recognizing VHWs as a salaried cadre.

Results from this study indicate that integrating VHWs in introduction of zinc will have a positive effect and will contribute similar results as in coverage of vitamin A supplementation and high use of ORS. However, any community-based intervention that will involve this cadre should include innovations for motivation and sustainability of the village health service provision programme. Current policies support VHWs and are a good opportunity to integrate VHWs into the programme of treatment of diarrhoea in children using zinc. Ensuring government commitment to this cadre of workers through provision of incentives, continuous training and adequate working materials/job aids will prevent attrition and ensure sustainability. VHWs can be used in the same way are being used in various other programmes (i.e. for basic information dissemination, distribution and/or selling of zinc tablets etc.). Given their proximity to those in need, and their role as communicators, VHWs can fill a vital gap in promotion of zinc as adjunctive therapy for diarrhoea.

VHWs have shown to be one mode of effective communication, sharing messages on diarrhoea and especially with zinc as treatment of diarrhoea. However, a strong multidisciplinary approach of communication strategies specifically with diarrhoea messages needs to be developed and implemented. There is now need to develop and implement a strategy for training village health workers (VHWs) in the treatment and management of diarrhoea. However, the effectiveness of VHWs in implementing this intervention will depend on how

well broader VHW concerns are addressed (i.e. provision of job aids, incentives and clear lines of accountability).

VHWs and CORPS are not sufficient, especially in more remote areas. The farther away the community is from a health facility, the more likely diarrhoea cases will be handled by traditional practitioners or treated from home. Integrating any facility-based intervention with community-based ones will improve the utilization of proven treatment strategies, such as ORS and zinc.

### **Social marketing**

Multiple outlets for zinc should be employed. It should be available in both public and private health facilities, in drug shops of all levels as well as using VHWs. In addition, it should also be made available in normal (food and domestic basic commodities) shops. A social marketing campaign of some sort needs to be incorporated to create the demand for these products once they are made available, potentially including radio/television spots and posters and brochures for health facilities and VHWs.

Social marketing has not been widely used in the past for promotion of diarrhoea treatment in Tanzania. Experiences from other health interventions employing a social marketing approach have proved it to be an effective method in reaching people with specific messages. In Kilombero district, for example, IHRDC through the ACCESS project utilized a social marketing approach, and realized a 20% increase in the correct recognition of malaria episodes and its aetiology. This intervention then contributed to a 20% improvement in the treatment rate of under-five children with fever through the use of antimalarials (22, 23).

One place mothers could learn about diarrhoea is from health facility care providers. Unfortunately, little communication between providers and patients or care takers prevails, thus the opportunity to promote preventive and treatment practice is missed. Given the difficulty of improving the quality of counselling across the entire population of health care

providers in Tanzania, limitations of the Community IMCI programme and uneven performance of CORPS, social marketing could play a key role in the reinvigoration of diarrhoea prevention and treatment. The strategy should re-position diarrhoea treatment by linking zinc treatment of diarrhoea with ORS (which already has high use and acceptability).

### **Assessment of the service delivery and behaviour change strategies**

Once the above recommendations are considered and refined, there is need to design and conduct a rigorous monitoring and evaluation system in small number of areas where zinc treatment for diarrhoea will be introduced to assess intervention performance and reach, including compliance and effect of zinc treatment on antimicrobial use.

### **References cited**

1. NBS. Tanzania Demographic and Health Survey 2004-05. Dar es Salaam: National Bureau of Statistics and ORC Macro; 2005.
2. Winch PJ, Gilroy KE, Fischer Walker CL. Effect of HIV/AIDS and Malaria on the Context for Introduction of Zinc Treatment and Low-osmolarity ORS for Childhood Diarrhoea. *Journal of Health, Population and Nutrition* 2008;In Press.
3. WHO/UNICEF. Joint Statement: Clinical Management of Acute Diarrhoea, WHO/FCH/CAH/04.07 or UNICEF/PD/Diarrhoea/01. 2004:7.
4. Baqui AH, Black RE, El Arifeen S, Yunus M, Zaman K, Begum N, et al. Zinc therapy for diarrhoea increased the use of oral rehydration therapy and reduced the use of antibiotics in Bangladeshi children. *J Health Popul Nutr* 2004;22(4):440-2.
5. Winch PJ, Gilroy KE, Doumbia S, Patterson AE, Daou Z, Coulibaly S, et al. Prescription and administration of a 14-day regimen of zinc treatment for childhood diarrhea in Mali. *Am J Trop Med Hyg* 2006;74(5):880-3.
6. Armstrong Schellenberg J, Bryce J, de Savigny D, Lambrechts T, Mbuya C, Mgalula L, et al. The effect of Integrated Management of Childhood Illness on observed quality of care of under-fives in rural Tanzania. *Health Policy Plan* 2004;19(1):1-10.
7. Armstrong Schellenberg JR, Adam T, Mshinda H, Masanja H, Kabadi G, Mukasa O, et al. Effectiveness and cost of facility-based Integrated Management of Childhood Illness (IMCI) in Tanzania. *Lancet* 2004;364(9445):1583-94.
8. NBS. Tanzania Service Provision Assessment Survey 2006. Dar es Salaam: National Bureau of Statistics and ORC Macro; 2007.
9. Bhutta ZA, Black RE, Brown KH, Gardner JM, Gore S, Hidayat A, et al. Prevention of diarrhea and pneumonia by zinc supplementation in children in developing countries: pooled analysis of randomized controlled trials. Zinc Investigators' Collaborative Group. *J Pediatr* 1999;135(6):689-97.
10. Fontaine O. Effect of zinc supplementation on clinical course of acute diarrhoea. *J Health Popul Nutr* 2001;19(4):339-46.

11. Baqui AH, Black RE, El Arifeen S, Yunus M, Chakraborty J, Ahmed S, et al. Effect of zinc supplementation started during diarrhoea on morbidity and mortality in Bangladeshi children: community randomised trial. *Bmj* 2002;325(7372):1059.
12. Rahman MM, Vermund SH, Wahed MA, Fuchs GJ, Baqui AH, Alvarez JO. Simultaneous zinc and vitamin A supplementation in Bangladeshi children: randomised double blind controlled trial. *Bmj* 2001;323(7308):314-8.
13. Haines A, Sanders D, Lehmann U, Rowe AK, Lawn JE, Jan S, et al. Achieving child survival goals: potential contribution of community health workers. *Lancet* 2007;369(9579):2121-31.
14. Winch PJ, Gilroy KE, Wolfheim C, Starbuck ES, Young MW, Walker LD, et al. Intervention models for the management of children with signs of pneumonia or malaria by community health workers. *Health Policy Plan* 2005;20(4):199-212.
15. Chakraborty S, D'Souza SA, Northrup RS. Improving private practitioner care of sick children: testing new approaches in rural Bihar. *Health Policy Plan* 2000;15(4):400-7.
16. Tavrow P, Shabahang J, Makama S. Vendor-to-vendor education to improve malaria treatment by private drug outlets in Bungoma District, Kenya. *Malar J* 2003;2:10.
17. Ellis AA, Winch P, Daou Z, Gilroy KE, Swedberg E. Home management of childhood diarrhoea in southern Mali--implications for the introduction of zinc treatment. *Soc Sci Med* 2007;64(3):701-12.
18. Winch PJ, Doumbia S, Kante M, Male AD, Swedberg E, Gilroy KE, et al. Differential community response to introduction of zinc for childhood diarrhea and combination therapy for malaria in southern Mali. *J Nutr* 2008;138(3):642-5.
19. Bhandari N, Mazumder S, Taneja S, Dube B, Black RE, Fontaine O, et al. A pilot test of the addition of zinc to the current case management package of diarrhea in a primary health care setting. *J Pediatr Gastroenterol Nutr* 2005;41(5):685-7.
20. Mbuyita S, Neema I, Armstrong-Schellenberg J. Evaluation of Community IMCI in thirteen districts in Tanzania. Draft report. Dar es Salaam: Ifakara Health Research and Development Centre, Ministry of Health and Social Welfare and UNICEF; 2007.
21. Mbuyita S. WAVI wapo wapi? A report from the assessment of role and performance of village health workers in Rufiji district. Dar es Salaam: Ifakara Health Research and Development Centre; 2005.
22. Hetzel MW, Iteba N, Makemba A, Mshana C, Lengeler C, Obrist B, et al. Understanding and improving access to prompt and effective malaria treatment and care in rural Tanzania: the ACCESS Programme. *Malar J* 2007;6:83.
23. Mshana C. Improved Access to prompt and effective malaria treatment in rural Tanzania. Annual Report to ACCESS project Steering Committee. Dar es Salaam: ACCESS Project; 2007.