GHSP

Dedicated to what works in global health programs

GLOBAL HEALTH: SCIENCE AND PRACTICE

Volume 1 | Number 3 | 2013

www.ghspjournal.org

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Table of Contents

November 2013 | Volume 1 | Issue 3

EDITORIALS

COMMENTARIES

VIEWPOINTS

Providing technical assistance to ministries of health: lessons learned over 30 years

Pursuing true country ownership for effective programs requires a long-term approach involving persistence, patience, keen understanding of counterparts' perspective, deference, building trust, focus on priorities, technical competence, and sustained optimism.

Steven Solter, Catherine Solter

Glob Health Sci Pract 2013;1(3):302-307
http://dx.doi.org/10.9745/GHSP-D-13-00121

ORIGINAL ARTICLES

''A cup of tea with our CBD agent … '': community provision of injectable contraceptives in Kenya is safe and feasible

Community health workers can safely provide the injectable DMPA when appropriately trained and supervised. We also found a fivefold increase in contraceptive uptake—a finding that builds on evidence from other countries for supportive policy change.

Alice Auma Olawo, Issak Bashir, Marsden Solomon, John Stanback, Baker Maggwa Ndugga, Isaac Malonza

Glob Health Sci Pract 2013;1(3):308-315
http://dx.doi.org/10.9745/GHSP-D-13-00040

Building on safety, feasibility, and acceptability: the impact and cost of community health worker provision of injectable contraception

This project in Zambia contributes to our understanding of the impact of community-based provision of injectables on method choice and uptake and of the costs of adding DMPA to an established community-based family planning program. The project also illustrates the importance of involving stakeholders from the outset, analyzing costs relevant to scale up, and engaging in policy change dialogue not at the end, but rather throughout project implementation.

Dawn Chin-Quee, John Bratt, Morrisa Malkin, Mavis Mwale Nduna, Conrad Otterness, Lydia Jumbe, Reuben Kamoto Mbewe

Glob Health Sci Pract 2013;1(3):316-327. First published online October 9, 2013.
http://dx.doi.org/10.9745/GHSP-D-13-00025

Understanding where parents take their sick children and why it matters: a multi-country analysis

To effectively reach children with potentially life-threatening illness with needed treatment, it is important to understand where parents seek care. Data from 42 DHS and MICS surveys conducted since 2005 show that a majority of care in Africa is sought from the public sector; in South Asia, from the private sector; and in Southeast Asia, from a public-private mix. We recommend that such data be made available in standard DHS and MICS reports.

Stephen Hodgins, Thomas Pullum, Leanne Dougherty

Glob Health Sci Pract 2013;1(3):328-358. First published online November 8, 2013.
http://dx.doi.org/10.9745/GHSP-D-13-00023

Obesity as a public health problem among adult women in rural Tanzania

Even in rural areas of Tanzania, an early stage of the nutrition transition is underway: 3 times as many women were overweight or obese than were undernourished. Overweight and obese women mainly follow a diet characterized by high consumption of bread and cakes (usually fried or baked in oil), sugar, and black tea.

Gudrun B Keding, John M Msuya, Brigitte L Maass, Michael B Krawinkel

Glob Health Sci Pract 2013;1(3):359-371
http://dx.doi.org/10.9745/GHSP-D-13-00082

Early pregnancy detection by female community health volunteers in Nepal facilitated referral for appropriate reproductive health services

Trained female community health volunteers provided low-cost urine pregnancy tests in their communities, leading to counseling and appropriate referrals for antenatal care, family planning, or comprehensive abortion care.

Kathryn Andersen, Anuja Singh, Meena Kumari Shrestha, Mukta Shah, Erin Pearson, Leila Hessini

Glob Health Sci Pract 2013;1(3):372-381. First published online September 16, 2013.
http://dx.doi.org/10.9745/GHSP-D-12-00026

Does free pregnancy testing reduce service denial in family planning clinics? A cluster-randomized experiment in Zambia and Ghana

Pregnancy tests, which cost very little (~US$0.10) and are often required for successful family planning service delivery, may reduce service denial, and should be available in all family planning clinics at no or minimal cost to clients.

John Stanback, Gwyneth Vance, Gloria Asare, Prisca Kasonde, Beatrice Kafulubiti, Mario Chen, Barbara Janowitz

Glob Health Sci Pract 2013;1(3):382-388. First published online September 24, 2013.
http://dx.doi.org/10.9745/GHSP-D-13-00011

Child malnutrition in Haiti: progress despite disasters

Despite a devastating earthquake and a major cholera outbreak in Haiti in 2010, surveys in 2006 and 2012 document marked reductions in child undernutrition. Intensive relief efforts in nutrition as well as synergies and improvements in various sectors before and after the earthquake were likely contributing factors.

Mohamed Ag Ayoya, Rebecca Heidkamp, Ismael Ngnie-Teta, Joseline Marhone Pierre, Rebecca J Stoltzfus

Glob Health Sci Pract 2013;1(3):389-396
http://dx.doi.org/10.9745/GHSP-D-13-00069

GLOBAL HEALTH: SCIENCE AND PRACTICE
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EDITORIAL

Injectable contraception provided by community-based health workers: one important step toward meeting unmet need

Community-based provision of injectable contraception continues to advance and is gaining wider acceptance—a major step toward meeting unmet need. However, fully addressing family planning need will require access to a much wider range of methods, including long-acting reversible contraception and permanent methods.

Following the endorsement by a technical consultation supported by the World Health Organization (WHO) in 2009,[1] a number of countries have embraced provision of injectable contraception by community-based health workers (CHWs). Two articles in this issue of GHSP support such provision and increase our understanding of it.

In rural Kenya, Olawo et al.[2] document the safety and acceptability of, and marked increase in, the use of injectables with CHW provision. And their efforts contributed importantly toward approval of CHW provision by the Kenyan Ministry of Health. Chin-Quee and colleagues[3] found similar results in Zambia, and they determined that if CHWs are already deployed, adding injectables to their work appears cost-effective. A major advantage of such community-based provision is that it supports equity by improving contraceptive choice for rural and low-income women with few contraceptive options.

Still, while CHW provision of injectables is an important and sensible advance that should be widely expanded, it has important challenges relating to coverage provided by CHWs and optimum contraceptive method choice. Regarding coverage, a recent constructive initiative has called for 1 million community health workers in sub-Saharan Africa by 2015.[4] Yet for now, with some notable exceptions, coverage of community-based service delivery for health services in low- and middle-income countries is rather limited. And, as documented by Hodgins and colleagues,[5] relatively few caregivers access key child health services from CHWs. Regarding optimum choice, although CHWs are clearly able to provide the short-acting methods of condoms, pills, and injectables (as well as the Standard Days Method®, the Lactational Amenorrhea Method (LAM), and emergency contraceptive pills), women and couples should have a much wider selection.

Injectable contraceptives have become the dominant method in many developing countries, especially in Africa.[6] They have features that are attractive to many women, and they are also relatively easy to deliver and are appealing to providers. But demand for limiting additional pregnancies is rising rapidly in Africa,[7] and continuation rates with all the short-acting methods are typically rather short. Expanding access to injectables is one excellent step toward meeting demand for family planning. But to make serious strides in meeting unmet need, expanding contraceptive choice, and advancing toward Family Planning 2020 goals,[8] we must energetically support additional service delivery models to expand access to a wider range of methods—especially the long-acting reversible contraception (LARC) methods of implants and IUDs, as well as permanent methods of contraception. *–Global Health: Science and Practice*

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GLOBAL HEALTH: SCIENCE AND PRACTICE
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EDITORIAL

Fulfilling the PEPFAR mandate: a more equitable use of PEPFAR resources across global health

Victor K Barbiero

As PEPFAR moves beyond its "emergency stage," it should now help support a more sustainable development mode, including an equitable platform for meeting a broad range of priority health needs, while continuing to pursue the goal of an AIDS-free generation.

INTRODUCTION

It is time to implement the broader United States Government (USG) global health mandate while maintaining priority for the most effective health interventions. The political and policy mandate exists to invest in a more flexible and more equitable approach. The recent Institute of Medicine (IOM) evaluation of PEPFAR applauds PEPFAR's impressive successes.[1] At the same time, the IOM points out 2 major challenges for PEPFAR: (1) to better address prevention through behavior change, and (2) to shift the burden and responsibility of programming more to the affected countries. Also, the President's Global Health Initiative (GHI) acknowledges the huge and compelling global health needs beyond those of HIV, including principles that focus on women, girls, and gender equity, and on health systems strengthening. The policy mandate for a broader PEPFAR approach already exists in its Hyde–Lantos authorizing legislation[2]:

- Section 4(6) (A) states: *"the USG should strengthen primary health care systems"*
- Section 301(b)(1)(B), Title III; Subtitle A states: *"It is the policy objective of the United States to strengthen the capacity to deliver primary health care in developing countries, especially in sub-Saharan Africa …"*

THE NUMBERS SPEAK FOR THEMSELVES: TOO MANY CHILDREN DIE EACH YEAR

Approximately 6.9 million people die annually before their fifth birthday from preventable causes.[3,4] By comparison, approximately 1.7 million people of all ages die from HIV[5]; about 1.4 million die from TB[6]; and about 655,000 die from malaria.[7] Thus, approximately 3.76 million people of all ages die each year from HIV, TB, and malaria combined—about 10,300 per day—an extraordinary and important number, to be sure. Tragically, however, about 6.04 million children under 5 years old also die annually from causes other than HIV, TB, or malaria (approximately 16,500 per day) (Table 1).

USG efforts can save the lives of millions more children annually through broader and more equitable use of the tremendous resources already available in global health programs, especially those within the purview of PEPFAR. Simply put, we just have to spend the money in different ways. The work of PEPFAR deserves kudos, as does the prevention and treatment efforts of the President's Malaria Initiative (PMI), investments to reduce TB mortality, and support for the Global Polio Eradication Initiative (GPEI). However, *the verticality of these programs is their Achilles' heel. A more equitable approach is required for global health programming.*

U.S. foreign assistance funding has increased in recent years, but it is grossly skewed (Figure 1 and Table 2). For example, in fiscal year 2013, the Congressional request for global health included US$5.68 billion for HIV and $847 million for maternal and child health.[8] In fiscal year 2010, USAID/Kenya received approximately $548 million for HIV/AIDS.[9] To put these resources in another perspective, in fiscal year 2010 the entire budget of the U.S. Peace Corps was $400 million.[10] Such inequities detract from the efficiency and effectiveness of USG health investments worldwide and levy an opportunity cost on other preventive and curative health interventions for children and mothers.

The crucial question is: *Rather than devoting the majority of our global health resources to sharply focused vertical efforts, can we implement a more flexible, more equitable resource base that will promote broader, more*

TABLE 1. Under-5 Deaths Excluding AIDS, Tuberculosis (TB), and Malaria

Cause of Child Deaths	Approximate No. of Child Deaths
AIDS	230,000
TB	75,000
Malaria	560,000
Total child deaths from AIDS/TB/malaria	**865,000**
Total under-5 deaths worldwide	6,900,000
Total child deaths from AIDS/TB/malaria	(865,000)
Annual under-5 deaths excluding AIDS/TB/malaria	**6,035,000**

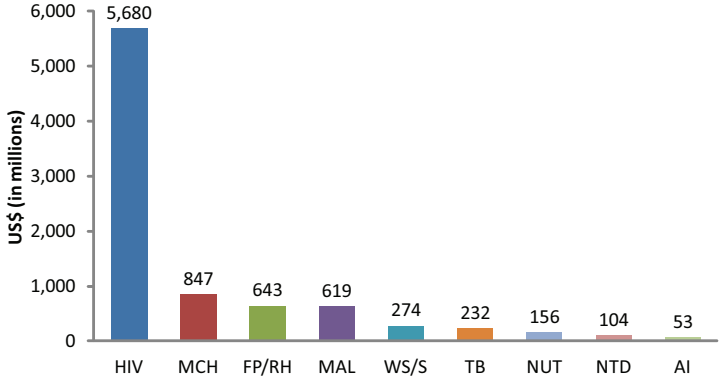
Source: References 3–7.

sustainable health development priorities while also achieving all of the (vertical) HIV, TB, malaria (and other) program objectives? **The answer is "yes."**

A vigorous debate is underway over vertical versus broader funding for global health assistance.[11,12] Some talk about diagonal funding through the Global Fund to Fight AIDS, Tuberculosis and Malaria.[13] Others contend that PEPFAR has significantly strengthened general health systems.[14] Advocates of vertical programming fear that broader use of resources will dilute impacts and delay success. But others question the epidemiologic rationale, sustainability, absorptive capacity, accountability, and opportunity costs associated with huge vertical appropriations, particularly in light of virtually flat-lined or proportionately declining appropriations in investments that equitably reflect epidemiological priorities.[15–17]

Currently, many program objectives remain sequestered in initiative-specific silos, and the bulk of global health resources remain vertically programmed within those silos. A broader, developmental approach would strengthen PEPFAR outcomes, save the lives of millions, and promote local ownership and sustainability. PEPFAR has transitioned from an emergency program to a more development-oriented program. At the country level, many USG programs seek to achieve the specific objectives of PEPFAR, while at the same time they integrate resources to promote lower-level system strengthening for key services such as routine immunizations, well- and sick-child care, newborn care, nutrition interventions, family planning, malaria prevention, and improved referral to reduce all-cause mortality and morbidity among women and children.

FIGURE 1. U.S. Government Health Sector Allocations, 2013



Abbreviations: AI, avian influenza; FP/RH, family planning/reproductive health; MAL, malaria; MCH, maternal and child health; NTD, neglected tropical diseases; NUT, nutrition; TB, tuberculosis; WS/S, water safety/sanitation.

Source: Reference 8.

PROMOTING SYNERGY WHILE MAINTAINING PRIORITIES

A clear rationale exists for broadening PEPFAR programming: *If you strengthen elements of the primary health system (including crucial public health components) in addition to HIV/AIDS service delivery, you will increase community ownership, overall quality of services, trust in the system, and sustainability, and, ultimately, this will result in greater use of more comprehensive health services by the local population.* Thus, greater PEPFAR investments in strengthening the platforms for service delivery will increase client draw, service availability, and health system use. In turn, this will not only achieve the objectives of PEPFAR but also improve the overall health of the community. A real win-win potential exists if we work smarter with PEPFAR (and PMI, TB, GPEI, and other) resources. We can achieve PEPFAR objectives and also save more of those 6.0 million children dying from non-HIV, TB, or malaria causes.

In many countries, particularly in Africa, U.S. foreign assistance often includes support for a

TABLE 2. PEPFAR Kenya-Approved Funding 2010

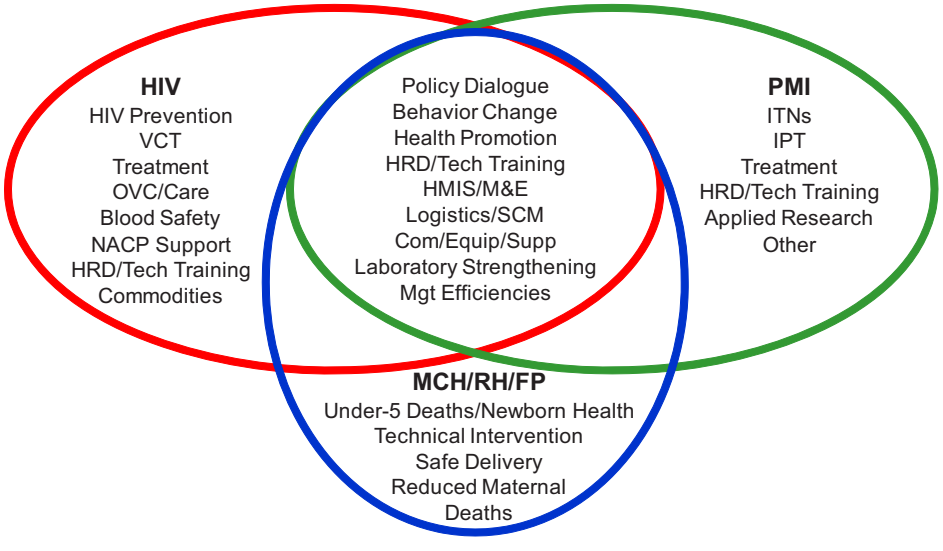
Agency	PEPFAR Funding (US$)
Department of Defense	23,546,982
Department of Health and Human Services	166,172,628
U.S. Agency for International Development	348,654,368
Department of State	9,745,463
TOTAL	**548,119,441**

Source: Reference 9.

wide range of health programming—HIV, TB, malaria, child survival, maternal health, reproductive health, family planning, and other infectious diseases. Figure 2 illustrates some of the potential *"systems synergies"* among HIV, PMI (and TB), and MCH/RH/FP programs. Many of the system elements that HIV, TB, and malaria efforts require to achieve their objectives also are required for saving the lives of children and mothers dying from other causes. Building on such synergies offers an evident economy of scale that is affordable, managerially efficient, technically sound, and also politically mandated by current USG policy. Although PEPFAR currently promotes some of these synergies, we need to do more.

Maximizing a more equitable distribution of PEPFAR resources will require setting specific objectives—both outcomes and impacts—for improving child and maternal health. In order to realize a broader and more equitable distribution

FIGURE 2. Health Systems Synergies: HIV, PMI, MCH/RH/FP



Abbreviations: Com/Equip/Supp, commodities/equipment/supplies; HMIS, health management information system; HRD, human resource development; IPT, intermittent preventive therapy; ITNs, insecticide-treated bed nets; M&E, monitoring and evaluation; MCH/RH/FP, maternal and child health/reproductive health/family planning; Mgt, management; NACP, National AIDS Control Program; OVC, orphans and vulnerable children; PMI, President's Malaria Initiative; SCM, supply chain management; Tech, technology; VCT, voluntary counseling and testing.

of global health resources, PEPFAR (and all other current special initiatives—for example, PMI, TB, GPEI, Feed the Future) should include specific additional priorities for strengthened health systems, strengthened capacity to deliver primary health services, including high-impact preventive services, and improved child and maternal health. We should embrace the following in all aspects of PEPFAR programming through the end of the decade:

- In addition to pursuing the stated objectives of treatment, care, and prevention for HIV/AIDS in countries that receive PEPFAR support, PEPFAR should aim to reduce child and maternal mortality by at least 20% by the end of the decade via broader, more equitable investments in systems strengthening, including infrastructure, human resource development, and sustained service delivery. Specifically:
  - **For children:** Reduce under-5 mortality from respiratory disease, diarrheal disease, immunizable diseases, and neonatal/perinatal causes such as preterm birth, sepsis, trauma, pneumonia, tetanus, and hypothermia
  - **For mothers:** Reduce pregnancy-related deaths of women through improved family planning service delivery, appropriate management of pregnancy and labor, improved maternal nutrition, and improved girls' education

We cannot continue to allow the 6.0 million deaths of children annually from non-HIV, TB, or malaria causes. Technically, politically, and morally, we have an imperative to promote a more balanced distribution of global health resources and to maximize the impact of these resources. The policy mandate is clear for the U.S. foreign assistance architecture to enter a new era of more equitable and sustainable efforts aimed at reducing global mortality and morbidity for mothers and children under 5 while simultaneously achieving an AIDS-free generation. With an expanded agenda and specific objectives crafted to further fulfill its initial mandate, PEPFAR could accomplish much toward meeting these goals. ***–Victor K Barbiero, Associate Editor***

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Cite this article as: . Fulfilling the PEPFAR mandate: a more equitable use of PEPFAR resources across global health. Glob Health Sci Pract. 2013;1(3):289-293. http://dx.doi.org/10.9745/GHSP-D-13-00137

GHSP GLOBAL HEALTH: SCIENCE AND PRACTICE
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EDITORIAL

Provider-generated barriers to health services access and quality still persist

Barriers to access and quality, such as long waits, disrespectful provider behavior, and medical barriers, continue to constrain health programs. Reducing them further requires a multipronged management approach that includes understanding and addressing provider behavior and the real problems providers face.

Barriers to access and to the closely related issues of quality have been long recognized as important health program constraints.[1] Such barriers have been addressed by a number of initiatives, including by improving guidelines, standards, and norms, and by various quality improvement approaches. Two articles in this issue of GHSP—Tumlinson et al. for family planning and Amin et al. for immunization—examine this issue using a variety of methodologies including mystery clients. Unfortunately, important provider-generated barriers are still alive and well.

Among the most prominent barriers:

- Disrespect and verbal abuse
- Lack of service—for example, provider absences, service not provided that day
- Medical barriers—such as requiring women to be menstruating in order to obtain a family planning method and not providing immunizations if a child has an illness
- Inadequate counseling
- Inappropriate fees (Tumlinson only)

The first of these—disrespect and abuse—has recently emerged as a major concern in the maternal health area.[2] Rudeness and abuse take on a particularly poignant role in that arena, because women in labor and at delivery are vulnerable and, in a sense, captive. Notably, Amin et al. found that previous provider rudeness in maternity care appeared to spill over to discourage caregivers from seeking immunization for their children.

On the positive side, much of what providers are doing appears to demonstrate reasonably good access and quality. So what will it take to reduce the important barriers that persist? There is, of course, no single answer. But it does require awareness of the problem and serious approaches to remedy it, including: training, supervision, management, further technical policy change, better supply chain, job aids, and engaging the consumer community to demand consistent and respectful service.

However, we also need to empathize with providers and get a better grasp of their perspective. Amin et al. give some insight on the provider prospective, including heavy workloads, lack of staff, requirement to provide multiple services (multitasking), and lack of transport.

These should come as no surprise. We know many such problems are common in health systems. Improving them, and improving access and quality, has no single solution but requires good systems and management thinking to address the problems. The worst thing we can do is pretend they do not exist. – *Global Health: Science and Practice*

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Cite this article as: Provider-generated barriers to health services access and quality still persist. Glob Health Sci Pract. 2013;1(3):294. http://dx.doi.org/10.9745/GHSP-D-13-00162

GLOBAL HEALTH: SCIENCE AND PRACTICE
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COMMENTARY

Routine immunization: an essential but wobbly platform

Robert Steinglass[a]

Despite their vital role, routine immunization programs are taken for granted. Coverage levels are poor in some countries and have stagnated in others, while addition of new vaccines is an additional stressor. We need to strengthen: (1) policy processes, (2) monitoring and evaluation, (3) human resources, (4) regular delivery and supply systems, (5) local political commitment and ownership, (6) involvement of civil society and communities, and (7) sustainable financing. Rebalancing immunization direction and investment is needed.

One-third of the way through the so-called Decade of Vaccines, this is an exciting time for immunization. The World Health Assembly has endorsed a Global Vaccine Action Plan (GVAP),[1] in which immunization is to be extended as a human right beyond infancy across the entire life cycle. Powerful new life-saving vaccines against some causes of pneumonia and diarrhea, the biggest contributors to child mortality, are being introduced. With a global sense of purpose and vastly increased resources, new partners have entered the vaccine and immunization arena. Anticipating the end of poliomyelitis, some are already scanning the horizon for the next disease to eradicate. However, at this promising moment, the immunization, disease control, and development communities collectively would do well to reflect on past and current directions so as to engage in a genuine debate about the need to restore balance within the realm of immunization.

ROUTINE IMMUNIZATION NEEDS GREATER ATTENTION

One school of thought holds that investments to achieve broad health system strengthening (HSS) goals will, like the tide, raise all boats and so contribute to the strengthening of routine immunization (RI).[2] The proponents of this theory use a preferred metric of reduced child mortality from all causes. Another school claims that investments in single-disease control, elimination, or eradication initiatives will strengthen RI and health systems more broadly.[3] The preferred metric among these thinkers is declining incidence of specific diseases; they argue primarily for investments in disease surveillance, laboratory support, and adverse events monitoring. Proponents on both sides in this long-standing debate, sometimes characterized as horizontal versus vertical approaches, believe strongly in their own path and argue that the funds are never enough, so choices have to be made. Each side claims its own goal is always just around the corner and achievable, if we just stay the course.

Both sides claim to be strengthening RI and make rhetorical claims that RI is a highly valued platform upon which their own ambitious goals partially rest. Rather than advocating increased investment directly into RI strengthening, each school of thought perpetuates a narrative that investments in their own approach obviate the need to invest in RI directly. The sides in this debate sometimes unhelpfully dismiss each other either as ''health-content-free reformers'' or ''disease cowboys.'' However, both schools overlook a more balanced, middle path: direct investment in RI strengthening as an integral part of the broader health system to achieve disease reduction goals.

Although responsible for the majority of immunizations given in nearly all countries, RI receives little attention, even from within the immunization community. As children will always be born and therefore always need to be vaccinated, RI programs exist in perpetual need of funds. Lacking strong champions, RI programs cannot generate the resources needed by global partners and ministries of health. Instead, prospective donors are promised that their investments in HSS and especially single disease initiatives will not only accomplish the primary goal, but also will produce any number of positive collateral spin-offs, including the strengthening and improved quality of RI.

The establishment and maintenance of RI systems suffer from a public image crisis. For some, RI is boring by definition, since it is routine. And if immunization is routine, this suggests a business-as-usual approach,

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Routine immunization receives little attention, even from within the immunization community.

which would be indefensible in the face of unacceptable levels of preventable child mortality. Otherwise, the reasoning goes, if RI was important enough, it would be reframed as a public health emergency, as has polio eradication. In contrast, RI advocates prefer to think that strong and steady investments in RI will win the race, and yet they often struggle to convince donors seeking a more rapid return on investments, in keeping with institutional mandates and short political cycles.

The global immunization community has prioritized improving access to new life-saving vaccines and eradicating or eliminating vaccine-preventable diseases. But the means to achieve these goals rely heavily on a continuously functioning RI program, which often receives only rhetorical attention and scant support.

ROUTINE IMMUNIZATION IS AN UNDERVALUED WORKHORSE

Global and regional routine immunization coverage levels have largely stagnated, with large disparities within and among countries.

Powerful new modeling and decision-support tools such as the LiST (Lives Saved Tool)[4] focus on a potential for future incremental mortality reduction. However, the significant *past* achievements in child mortality reduction, owing to more mature interventions such as immunization, cannot be maintained without continued focus and investment.[5] With the current deployment of new vaccines against some infections that cause pneumonia and diarrhea, the World Health Organization (WHO) estimates that 29% of deaths among children 1–59 months of age are currently vaccine-preventable.[6] These new vaccines, as well as future ones being developed for malaria and HIV, will require a strong RI platform to deliver their promise.

Strengthening routine immunization within the overarching health system must be recognized as a development challenge.

Although rarely acknowledged, RI is the workhorse needed to sustain gains from episodic mass immunization campaigns and to prolong intervals between those campaigns. For example, WHO estimates that, of the approximate 12.7 million measles deaths prevented by immunization from 2000 to 2008, 66% (8.4 million) were averted by maintaining RI coverage at the year 2000 level, while an additional 33% (4.3 million) were averted through increases in RI coverage and mass measles immunization campaigns.[7] Yet despite the importance of RI, the support it requires is not costed in regional and national measles elimination plans, particularly in countries with weaker health systems, leaving these disease-specific plans decidedly unbalanced.

THE PLIGHT OF ROUTINE IMMUNIZATION

In some of the regions with the poorest performing countries and the greatest need, resources devoted to RI are scarce. For example, over at least the past 5 biennial budgets in the WHO Regional Office for Africa, only approximately 5% of the immunization budget has been directly devoted to RI, and not all of that is mobilized or used. The vast majority (85%) of the WHO/AFRO immunization budget goes to polio eradication.[8–11] Furthermore, the Africa Routine Immunization System Essentials (ARISE) project documented a widespread misperception that the Global Alliance for Vaccines and Immunisation (GAVI) provides major support for immunization service delivery, whereas in fact approximately 90% of their support goes for the purchase of new vaccines.[12]

Because vaccinations can be counted, although not as accurately as desired (as evidenced by disparities between service statistics and many Demographic and Health Survey findings), program performance tends to be regularly measured by coverage levels reported at national and subnational levels. In recent years, global and regional RI coverage levels have largely stagnated, with large disparities within and among countries. In the lower-performing regions such as Africa and Southeast Asia and in a large number of countries within every region, infant coverage with the third dose of DTP (diphtheria-tetanus-pertussis) and the first dose of measles vaccines, both given through the routine system, has either declined or stagnated at between 70% and 80% in each of the past 5 years.[13–14] And the global number of children not fully immunized with the third dose of DTP-containing vaccines—more than 20 million now—has remained largely unchanged over the past 5 years.[6]

ROUTINE IMMUNIZATION IS A DEVELOPMENT CHALLENGE REQUIRING A SYSTEMS APPROACH

The challenges facing RI are great, and immunization coverage must not be the only consideration. Before exposure to disease, infants and other individuals must be routinely reached with potent vaccines in a safe, effective, and affordable way and with adequate service quality, so that they will want to return to complete all their doses. Achieving this within the overarching health system must be recognized as a development challenge, broader than a disease-control

challenge. A steady marathon, not a sprint to some short-term finish line, is required.

Retaining the trust of families and communities is an old challenge that requires systematic effort to ensure the predictability and quality of services. Families need information and counseling to become aware of and accept immunization services. Families must know where and when to come for immunization and to bring vaccination cards. They must be treated affably and respectfully by health workers.

Building a strong RI program as an integral part of the health system is a development challenge that requires a systems approach. As illustrated in the figure, a cohesive, well-functioning immunization program includes many components, all of which dynamically interact to influence the accessibility, availability, acceptability, and affordability of services, with a desired result of continuous coverage, improved service quality, equity, and sustained disease control. Immunization programs require more than just a supply of vaccines and surveillance, which are often the dominant focus of donors. But many countries in Africa and Asia do not receive a balanced and multidisciplinary package of technical support from partners across the many interconnected components. Instead, certain key RI program components (such as supply chain management, program communication, community partnerships, supportive supervision, local use of performance data, and financial management) are consistently neglected for a variety of reasons, including the institutional preferences of partner agencies, formulaic top-down prescriptions, and the absence of a learning culture to identify and spread innovative approaches.

Strengthening RI system performance and monitoring, as part of a functioning health system, is the foundation to achieving immunization goals. Yet, despite their relative maturity, RI programs in many countries have become increasingly fragile, even as they face new challenges, as evidenced by a plethora of national immunization reviews, vaccine management assessments, and reviews following the introduction of new vaccines. Despite known gaps and the introduction of new vaccines, the vast majority of low-performing countries receive no technical support to strengthen capacity for immunization supply chain management. Most WHO regions have no officer looking after cold chain and logistics. As with the cold chain, strengthened capacity through constant attention, maintenance, and repair is needed for sustained, effective, and efficient performance of the entire program. The substantial accomplishment of RI programs in the past does not guarantee success in the future.

FIGURE. Conceptual Framework: Immunization Sub-System

Source: Adapted from reference 15.

HOW CAN ROUTINE IMMUNIZATION BE STRENGTHENED?

As identified by one of the Decade of Vaccines working groups,[16] co-led by the author, key approaches to strengthen performance of RI systems and monitoring must include:

- **Strengthening the structure and processes for developing immunization policy, strategies, and best practices.** Policies and strategies for public health should be developed nationally, taking into account national health priorities and capacities, rather than by top-down implementation of global and regional recommendations. This is essential to promote greater country ownership and commitment to the program and to reduce external dependence.
- **Improving systems and tools for generating evidence, monitoring program performance, and the use of data for action.**

Many countries in Africa and Asia do not receive a balanced and multidisciplinary package of technical support from partners across the many interconnected components.

Strengthening the capacity for monitoring and surveillance is required to improve use and quality of data to inform policies and strategies, for planning at all levels, and for documenting the impact of the program. The use of coverage and management data also needs strengthening at sub-national levels to locally identify and correct problems.

- **Training, deploying, supporting, and supervising adequate human resources for program management and implementation.** Sufficient numbers of competent health workers, equitably deployed and supported by strong health systems, are required to manage and implement immunization programs. New insights must be applied into what works in planning, managing, educating, and supporting health workers, both formal and informal. New approaches are needed to support learning through pre- and in-service education and to address lack of motivation and underperformance.
- **Building, maintaining, and sustaining regular immunization delivery and supply systems.** Cold chain and logistics systems, which have been established, strengthened, and maintained over the past 30 years as the backbone of immunization programs, must be revitalized to face new challenges (such as new, more costly, more bulky vaccines) and to take advantage of technological advances. Today, more than ever before, managers must be able to maintain lower stock levels, reduce wastage, accurately forecast vaccine requirements, and prevent equipment breakdowns or malfunctions so that target populations can access and make use of high-quality and safe immunization services.
- **Promoting greater ownership, political commitment, accountability, and self-reliance of immunization programs at all levels.** Political commitment, good stewardship, and broad political engagement at national and sub-national levels are required to own and support the immunization program. Given the numbers of other important stakeholders, ranging from religious and community leaders to civil society organizations, to parents and caretakers, efforts to stimulate and sustain societal commitment are also needed. This commitment should contribute to increased accountability and country ownership of immunization programs, thereby leading to greater cooperation, participation, and ultimately even increased government funding.
- **Broadening the engagement of civil society and communities.** Civil society has an essential—but underappreciated—role to play in the full range of immunization activities, from policy development through resource mobilization and accountability, service delivery, reaching underserved communities, demand creation, surveillance, operational research, and monitoring and evaluation. Better engagement of civil society will be necessary to ensure strong immunization and other health programs.
- **Achieving sustainable immunization financing and sound financial management.** Poor financial management and heavy dependence on donors are interrelated problems. Consequently, the efficiency of programs is unknown, and there is little or no budget oversight or accountability. Budgeting reforms, improved inter-ministerial financial management, and long-term innovative financing mechanisms must be addressed together so that governments and other domestic stakeholders have the incentive to invest more in immunization and reach sustainable financing goals. More advocacy and oversight from parliaments, sub-national officials, community service organizations, and other influential groups will add strong new incentives.

Many of these approaches have begun to receive new attention.

PROMISING DEVELOPMENTS

In addition, there have been some promising recent developments among global partners. The Bill & Melinda Gates Foundation developed a RI strategy in 2012 to identify and focus on some of the unaddressed challenges, particularly the need to improve data quality and use, as well as immunization supply chain logistics necessary to protect investment in expensive new vaccines.

GAVI has recognized that its investment model, in which 90% of its funds are spent on vaccine procurement, must be complemented with more focused support for HSS in which RI takes center stage. There is also greater recognition that improving ''access'' to vaccines—primarily focusing on their development, supply, and financing—must be accompanied by a greater focus on

strengthening the delivery, quality, timeliness, and use of immunization services.

WHO and the United Nations Children's Fund (UNICEF) manage a Vaccine Presentation and Packaging Advisory Group, in which industry and public health officials come together to identify desirable characteristics of future vaccines. WHO has revamped its vaccine prequalification process to highlight characteristics of vaccines that are programmatically most suitable for use in less-developed countries.

UNICEF is rightly stressing the need in all of its programming to reach underserved populations—for example, the urban poor, remote communities, marginalized groups—and to address equity gaps. Current global support for ''universal health coverage'' provides a mandate for ''universal immunization coverage,'' and UNICEF's advocacy will be needed to ensure that immunization is vigorously included in such efforts.

IMPLEMENT ROUTINE IMMUNIZATION MORE SMARTLY

Despite these encouraging changes in partners' focus, RI programs must still learn to adapt in order to overcome persistent challenges and seize new opportunities. RI programs should engage better with broader HSS efforts, such as using information technology more effectively, to ensure that immunization is well-addressed.

What has worked in the past may have reached its limits. In their impatience to rapidly improve coverage by overcoming immediate obstacles, as opposed to strengthening the overall RI system, partners sometimes promote unsustainable workarounds—often in the name of integrated service delivery, during which vitamin A supplements, bed nets, and other services are offered along with immunization. Periodic intensification of RI, for example, through semi-annual Child Health Days or Weeks, can be effective if they actually reach additional underserved populations with immunization services, but they must be deliberately planned and executed to avoid undermining the ability of the RI system to function for the remaining 50 weeks of the year.[17] For example, at the end of intensified days or week-long campaigns, especially if new service delivery points have been temporarily created for the event, health workers then face difficulty integrating health records and screening the immunization status of individual children, who must continue to receive the remaining doses in the series.

More focus is needed in specific areas. For example, operationalizing the WHO/UNICEF Reaching Every District (RED)[18] approach to reach the underserved deserves greater attention and better quality efforts from technical partners. Because RI services can be scheduled, they can be better planned, managed, supervised, monitored, and linked with communities. The RED approach is a common-sense package for doing that, but in too many countries ''doing RED'' has become a meaningless mantra, reduced to a one-off training exercise focusing only on the micro-planning component of the approach.

The immunization community also must move beyond the never-ending cycle of gap/barrier/bottleneck analyses that launch every initiative, identifying long lists of problems (for example, ''cold chain broken,'' ''supervision weak'') and making unhelpful, anodyne recommendations (''fix the cold chain,'' ''strengthen supervision''). But what works? What drives good performance? And under what conditions do innovations and good practices emerge, take root, and spread? What pre-conditions should be cultivated to encourage the development of promising approaches and innovations? Immunization programs at all levels must do a better job of capturing and accelerating learning about what works, how it works, and in what contexts it works—so as to spread promising practices more rapidly.[19] Using implementation research approaches such as assets-based, appreciative inquiry and a mix of quantitative and qualitative methods, immunization programs need to identify positive deviants (those that are performing well in spite of common constraints) among district managers, health facility staff, and community leaders who can serve as examples to others facing similar challenges.[20]

Immunization programs must do a better job of capturing and accelerating learning about what works, how it works, and in what contexts it works.

WHAT CAN BE LEARNED FROM THE POLIO ERADICATION LEGACY?

Polio certainly must be eradicated, and soon, but this message needs to be better nuanced, without overstating what collateral benefits the polio model and assets contribute to RI strengthening. A one-time sprint to the polio eradication finish line differs from the marathon approach required to affordably and sustainably develop and strengthen RI programs. The operational strategies

employed by the Global Polio Eradication Initiative (GPEI)—such as well-funded armies of ''volunteers'' going door to door to vaccinate children—are very resource-intensive in terms of money and staff and do not need to be sustained. For GPEI, the end justifies the means—but those means can distort RI programs and health services more generally. With ample funding and staff, the GPEI understandably does end-runs around the health system. These shortcuts work for the GPEI but not for RI programs, which must determine how to overcome systemic barriers and work affordably through the health services. Contrary to the GPEI, the RI program must reach individual children in a timely way with all appropriate age- and dose-specific vaccines through reliable and good-quality services, year after year. The planned introduction of the injectable inactivated polio vaccine over the coming few years in more than 100 countries, as part of the so-called end-game strategy,[3] has some potential to increase the focus on RI strengthening.

The immunization community must aim not only to increase but also to rebalance current and future investments.

A BALANCED WAY FORWARD

A robust RI program, functioning within the health system, is required to achieve ambitious goals and sustain them. These goals include disease elimination and eradication, smooth introduction of new vaccines across an expanded life cycle, increased immunization coverage, greater equity, and reduced mortality to achieve the Millennium Development Goals. To be successful, the global community must recognize that the fundamental platform—the routine immunization system itself—must be directly supported and reinforced.

The immunization program must be rebalanced to consolidate and sustain its gains and to complete the task of polio eradication, rather than prematurely embarking on new, overambitious goals. The global health and development community should insist on a moratorium on adopting any more disease-eradication goals without a broader and vigorous public debate, evidence identifying programmatic and financial opportunity costs in advance, a determination that the benefits outweigh the risks and costs in all populations, and a system in place to hold these initiatives more accountable for specifically strengthening the RI system and the health system more broadly. In the near-term, the immunization community must endeavor to advocate the eradication of polio without overstating its so-called ''legacy'' for RI.

A culture of learning is more likely to emerge when it includes multiple perspectives, diverse disciplines, and broad partnerships.

New vaccine introduction, polio eradication, measles elimination, and tetanus elimination efforts must be used more strategically and deliberately to overcome persistent system challenges, optimize positive spinoffs, and mitigate negative ones. Judging from experience, this does not happen automatically. What will it take to do so?

The immunization community must aim not only to increase but also to rebalance current and future investments, so as to sustainably overcome the recognized but still chronic weaknesses in RI programs. This will require mobilizing and sustaining not only political will but also social will at all levels of government to meet the recurring operational costs of programs over time—not just focusing on the next externally driven event (for example, mass campaign or new vaccine launch) on the horizon.

The immunization community must assure that essential preventive services such as RI continue to work in the context of health sector reform, whether it involves integration, decentralization, or privatization. Constantly scanning the horizon to identify opportunities and threats, making necessary adaptations, and seeking continued investment are necessary. In addition, health services should do a better job of using the RI system as a vehicle to scale up other population-based interventions.

To overcome stagnation and improve performance, the immunization community must create opportunities for countries, districts, and health facilities to learn from each other and to better identify and accelerate the spread of good practices. The ultimate innovation could be to create a stimulating learning culture that seeks to do this. A culture of learning is more likely to emerge when it includes multiple perspectives, diverse disciplines, and broad partnerships, and when staff members have an opportunity to learn from peers working on the same problems.[19]

Vaccines offer unprecedented promise to reduce incalculable human misery, but only by creating and maintaining a vigorous routine immunization platform will this come to pass.

Competing Interests: None declared.

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Peer Reviewed

Received: 2013 Aug 14; **Accepted:** 2013 Oct 2

Cite this article as: Steinglass R. Routine immunization: an essential but wobbly platform. Glob Health Sci Pract. 2013;1(3):295-301. http://dx.doi.org/10.9745/GHSP-D-13-00122

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VIEWPOINT

Providing technical assistance to ministries of health: lessons learned over 30 years

Steven Solter,[a] Catherine Solter[b]

Pursuing true country ownership for effective programs requires a long-term approach involving persistence, patience, keen understanding of counterparts' perspective, deference, building trust, focus on priorities, technical competence, and sustained optimism.

INTRODUCTION

Beginning in 1976, we have each spent more than 30 years providing technical assistance (TA) to ministries of health (MOH), chiefly at the central level but also at the provincial level. More than 20 of those years were spent providing long-term assistance—that is, a year or more of continuous residence as a ministry advisor—in Afghanistan, Cambodia, Indonesia, and the Philippines. We have also provided short-term assistance to health ministries in many other countries. We both have worked for nonprofit organizations that provide technical assistance in public health to developing countries.

Over this period we have encountered an enormous variety of situations in the health ministries where we worked—major differences in cultural values, political pressures, priorities, and personalities among our ministry counterparts—and yet we feel that there was some consistency across the various countries in terms of what worked and what did not and why. We have learned a great deal from making almost every imaginable mistake at one time or another. This brief paper is an attempt to distill some of the major lessons we have learned (with examples) in order to contribute to discussion among those trying to provide the best technical assistance they can.

We have identified 10 lessons that we believe are among the most relevant and important. Some may seem self-evident; others are less so. The evidence must, by the very nature of the work, be largely subjective and anecdotal. A randomized field trial of technical assistance is not feasible. What we describe is based on our own experiences, which are not necessarily generalizable. However, in our discussions with other advisors over the years, we have found our experiences to be quite typical. Therefore, we propose these 10 principles to assist providers of technical assistance to ministries of health in helping governments make progress in health care.

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THE TOP 10 LESSONS LEARNED

(In no specific order, but with particular relevance to long-term TA)

1. **When you begin work as a technical advisor, your 2 immediate, overriding objectives are to establish trust and to demonstrate that you can add value**. Most of our ministry counterparts have been extremely polite, hospitable, and respectful, and they were not critical of our actions (or inactions) even when we deserved to be criticized. But that didn't mean they trusted us. We had to earn their trust, which takes time. An important caveat regarding establishment of trust is the importance of knowing where your loyalties lie and being up front about them. In most cases your loyalty is divided among ministry counterparts, the donor, the organization that employs you, your colleagues working with you as part of a technical assistance team, and the people of the country you are trying to serve. It can be very confusing and difficult when, for example, the donor expects you to represent them to the ministry at the same time that the ministry expects you to represent them to the donor. You are caught in the middle, trying to be honest and fair to both sides. There is no simple answer (other than to be honest and straightforward with all parties). There is one thing, however, that you should avoid if at all possible, and that is to have a hidden agenda.

For example, we remember a donor that had a large quantity of contraceptives that were about to expire and wanted us to convince our counterparts to accept them as a donation. This made it difficult to do our job—to provide the best possible advice to the ministry.

Proving that your presence adds value can be a challenge, especially when your ministry counterparts are well aware of your high salary (compared with theirs) and are often unhappy about the fact that donor money is going to you instead of to them. It is imperative that you understand your counterparts' agenda and the constraints that they are facing so that what you offer is perceived as truly helping them to achieve their objectives. Very often senior health officials are facing political pressure from higher-ups, and they may ask for your help with something that isn't in your job description. A typical example is when you are asked to draft a presentation they need to make (in English) at an international conference, and they need it tomorrow! If you do it, without complaint and on time, you can go a long way towards convincing them that you actually do add value.

2. **It's their country, not yours, and they make the decisions, not you.** This should be obvious, but it's surprising how often ministry counterparts think of you as a ''foreign expert'' and therefore more knowledgeable than they are. Fortunately, the trend is now going the other way, as more and more health ministry staff members obtain master's and doctoral degrees and no longer always feel that they know less than you do.

   An important responsibility of being a technical advisor is to assemble evidence-based options for decision-makers to review and decide which option is best under the circumstances. As an advisor you can present your point of view, but the decision isn't yours to make. A case in point was when the head of the maternal and child health unit of a MOH asked one of us to help with planning the country's first National Immunization Day. Our advice was to include only oral polio and vitamin A for the first round. We thought including too many antigens would be complicated and could result in delays as mothers wait in line in the heat with crying babies to register for DPT (diphtheria, pertussis, and tetanus), BCG (bacille Calmette-Guérin), and measles vaccines. Furthermore, adding these antigens requires needles and syringes and trained staff, whereas oral polio and vitamin A capsules can be given by villagers with a brief training beforehand. Our advice had logic on its side, but it turned out to be dead wrong. The ministry and the villagers organized things so well that all the antigens were given at the same time with nary a hitch. It turned out to be a good thing that we *didn't* make the decision.

3. **Understand the full context of your counterparts' situation, and base your assistance and advice on an understanding of where he or she is coming from.** For example, it is often months or even years before advisors fully understand how health ministries handle procurement. In a province where we worked, it took 46 signatures to procure an item vital for public health work, making the process incredibly time-consuming. But we didn't realize why everything moved so slowly, and so much of our advice was irrelevant.

   Another example, from a different country, involved concerns of health officials over potential accusations that they were selling government items in the market and pocketing the money. In order to protect themselves from such charges, the safest thing to do was to lock up everything and not allow anything to get out of sight. As a result, midwifery kits were locked up and never used, and empty cooking oil tins by the thousands were kept in a warehouse for years as proof that the oil had actually been distributed rather than sold in the bazaar.

   Similarly, we once saw a guard burying a broken chair in the ground. When we asked him why he was doing that, he said that the chair was broken beyond repair, but, if he threw it out, in the future someone might accuse him of selling it. If that accusation were ever made, he could go to the spot where the chair was buried, dig it up, and prove that he was innocent.

   A final example involves a ministry whose procurement regulations were so restrictive that purchasing the pens and notebooks for a training workshop had to go out for bids. Since we didn't realize that this was happening, we

It is imperative that you understand your counterparts' agenda and the constraints that they are facing.

weren't able to suggest alternative (and much faster) ways of obtaining the pens and notebooks. As an advisor, if you're not fully aware of such constraints at all levels of the system, your advice is likely to be impractical or ignored.

4. **Out of sight, out of mind—it's important to "be there."** There are perils in being a long-term advisor, but there are also risks for those providing short-term technical assistance at a ministry of health. One problem faced by the long-term advisor is that after several years he or she becomes "part of the furniture" and is no longer listened to as carefully or taken as seriously as in the first 1 or 2 years. Most foreign advisors have a limited repertoire of messages and concerns that they feel passionate about. When those messages and those passions have been expressed over and over, our counterparts tend to tune us out. But if you stay the course and stick around for a number of years, it's possible to make a real difference in terms of policy and other initiatives that can have real impact. The first rule of public health technical assistance is "be there."

One problem faced by the long-term advisor is that after several years he or she becomes "part of the furniture."

Those providing short-term technical assistance face an even tougher challenge: Once they're out the door and on the way home, they tend to be forgotten and their advice ignored (until the next time they come). One distinguished short-term consultant, a former medical school dean and noted researcher, came as a World Health Organization (WHO) consultant to advise on cancer control. He was told that he was the seventh such consultant over the past decade and that none of the recommendations of his 6 predecessors had ever been implemented. He was absolutely determined to change that pattern, and he did everything humanly possible to ensure that his cancer control recommendations would be carried out. Alas, it was not to be. His recommendations were ignored like all the others. But then, 8 years after he left, the ministry became actively engaged in cancer control, dug up the old recommendations, and actually implemented some of them. The lesson here was that the ministry decided when it was ready to take on a new initiative, and no consultant was going to get them to do it before they were ready. Short-term advisors need to be aware of this risk, but we don't know of any way to guarantee that their recommendations will be followed. You can try to identify a ministry official who will champion your suggestions, but beyond that it is difficult to overcome the "out of sight, out of mind" syndrome.

5. **WHO does a great job in setting international standards and guidelines, but sometimes ministries of health defer to international guidelines rather than adapt those guidelines to fit the special circumstances prevalent in their country.** Over the years both of us have been struck by the "WHO paradox." WHO does a superb job of developing international standards, guidelines, and protocols. Most ministries of health in developing countries follow those standards very closely, and the guidance has made an enormous difference in quality of care and impact on mortality. The problem is that, even though WHO always insists that each country must adapt the standards and guidelines to fit their own particular circumstances, in reality many countries hesitate to make any changes out of fear that they'll be violating international norms.

One example occurred when a Geneva-based WHO expert came to a ministry meeting to discuss the use of misoprostol in home births. The ministry had already conducted a field trial in which 1,000 pregnant women received misoprostol tablets from the local volunteer female community health worker (CHW) without a single instance of the drug being given at the wrong time or diverted for use as an abortifacient. Despite this strong evidence of safety and despite the fact that the maternal mortality ratio was extremely high in the country, the WHO advisor strongly advised the ministry not to allow CHWs to give families misoprostol prior to delivery on the grounds that the CHWs didn't have enough training to do it safely (although their training lasted 6 months). The ministry backed down and sharply reduced its plans to scale up misoprostol distribution. Many other examples could be cited to make the same point. The challenge for ministries and for us as advisors is to listen to WHO's advice and take it seriously, but also to recognize that a country's unique

situation often calls for a modification in the policies and guidelines recommended by WHO.

6. **Country "ownership" rarely happens, but it has to be a top priority.** Although donors and international agencies continually tout the concept of "country ownership," we have rarely seen it in practice. The main problem, in our experience, is that ministries of health are often so dependent on donors for the bulk of their funding that they hesitate to oppose any suggestion by a donor, even when ministry officials feel it is not in the country's best interest. But donors often are focused on international priorities rather than the priorities of a particular country.

   Yet this is another situation where we think the trend is moving in a positive direction. In recent years health ministries have begun to assert themselves and be more vocal vis-à-vis donors to express their views about what may or may not be appropriate. We applaud this trend, but we are concerned that many ministries still lack basic skills in "donor management" and end up doing what the donors want rather than what they want.

   We also recognize, however, that doing what the donor wants is not always a bad thing, since in our view the donors are often right about priorities. For example, donors often advocate for CHWs to provide injectable contraceptives as well as community case management for diarrhea, pneumonia, and malaria. The ministry may resist these interventions on the grounds that only better trained health workers should be diagnosing and treating or giving injections. Regardless of who's right and who's wrong, ministry of health officials, not the donors, should "own" the policy decisions and interventions that follow. Unless the ministry makes the decision, it won't "own" its implementation or its effects.

7. **Keep it simple and focused.** We have seen over and over again the mistakes we've made when we (and our fellow advisors as well) propose options and scenarios more complicated than they need to be, and when we and our counterparts try to do too many things at once. It is demonstrably true that we can do 20 things badly or 3 things well. Very often, for political reasons, our ministry colleagues have difficulty prioritizing, since there is a political constituency for everything they want to do. Everything is vitally important, and nothing can be left out. Possibly the most important thing we can do as advisors is to help our ministry colleagues focus on a few top-priority activities and interventions and help them place lower-priority activities on the back burner. We can sometimes facilitate this process because we are "outside" the political, ethnic, and cultural system they inhabit, and, if anyone criticizes them, they can blame it on the advisor, who doesn't know any better.

   Possibly the most important thing we can do as advisors is to help our ministry colleagues focus on a few top-priority activities and interventions.

   Keeping it simple is necessary because a simple concept can obtain political traction among higher-level decision-makers, whereas overly complicated proposals usually get nowhere. Also, nearly everyone values keeping things simple, and it is a way that we, as advisors, can "add value" in our day-to-day work. Sometimes our counterparts think that a more complicated proposal or paper is better because it is more sophisticated and looks like journal articles they have seen over the years. It is our job to try and disabuse them of that notion.

   Keeping it simple is necessary because a simple concept can obtain political traction among higher-level decision-makers.

8. **When you see evidence of corruption, act on it.** All long-term advisors and many short-term consultants encounter evidence of corruption at one time or another among their ministry colleagues. A common response is to ignore it, since one is rarely certain that it has actually occurred, and, in any case, if you raise the issue, you are likely to get in hot water and possibly lose your job, or even be asked to leave the country. But to do nothing perpetuates the problem. The question is: what to do? As a foreigner, you have to tread very carefully, but there is usually an existing mechanism that can be used to report what you have found.

   One of our experiences illustrates the problem. The project involved paying community-based volunteers a small amount of money to identify suspected tuberculosis (TB) cases and having their sputum checked at a health facility with a trained microscopist (in the early 1980s). The volunteer was paid for each sputum-positive individual and then

paid a second time (more money than the first payment) when the patient converted after treatment to sputum-negative. The program started out as a rollicking success, with hundreds of new sputum-positives identified, treated, and cured. But the money to pay the villagers came from the donor to the central MOH, which passed it on to the provincial ministry, which in turn gave it to the ministry at the district level and finally to the sub-district, where the villagers were to be paid. Alas, by the time the funds were supposed to arrive at the sub-district, there was nothing left. Apparently, each level had taken its cut. Thus, all the money had been siphoned off, and there was nothing left to pay the villagers. Needless to say, the activity ground to a sudden halt. We didn't press the matter, fearing that doing so would jeopardize the project's other activities and also could poison relations with counterparts. But the end result was a failed activity and hundreds of people with active TB going undiagnosed and untreated. We should have pressed the issue.

''Indicator creep'' is a common disease.

9. **Help your counterparts collect the right information to provide evidence to their ministries; support "data for decision-making" at the local level.** We have found that ''indicator creep'' is a common disease—far more indicators than necessary are designated as crucial, and the number keeps growing. We remember an advisor working with MOH counterparts trying to reduce the number of indicators routinely reported from health centers throughout the country (this was around 1980, in the early days of computerization). Because the MOH was not experienced in inputting the data, every month the backlog grew larger, until there were enormous stacks of monthly reports not yet processed. But every time the advisor met with program managers (epidemiology, maternal and child health, tuberculosis, etc.), the list of indicators actually got longer, not shorter. The program managers kept discovering new indicators that they wanted to include in the monthly reports.

   Of course, indicator creep places an unnecessary burden on those collecting routine data at the local level. Sometimes we ourselves have been guilty of collecting too much data—a syndrome known as ''Data Rich, Information Poor'' or DRIP. The quantity of data can be overwhelming, and prioritizing becomes more difficult. But the crucial point, we've found, is this: most health workers at the local level see routine data collection as a burden and that what they are required to do is simply to report the data to the next highest level. They do not see the opportunity to use the data to figure out how to do a better job and improve their performance. We have seen many health centers shut their doors to patients at noon so that they can spend the afternoon collecting, recording, and reporting data. The data are then passed up the chain and eventually get included in obligatory reports that no one reads. The lesson we've learned is the importance of working with the health staff members at community and facility levels who actually collect the data to help them learn how they can use it themselves instead of only sending it to the next level. It is more important to use routinely collected data locally than to report it and forget about it.

10. **Manage expectations, but remain optimistic about what can be achieved within a typical 5-year project life cycle.** It frequently happens that donor-funded projects have unrealistic goals and objectives and that the expectations of donors and counterparts alike become impossible to satisfy. Part of the advisor's job is to help counterparts and donors to be realistic, especially about what can be achieved in a fixed and limited period of time, and what can truly become financially sustainable. Once again, the question of priorities becomes paramount; it is critical from the outset of the project to reach consensus among all stakeholders regarding what is of overriding importance and what isn't. Reaching this consensus early on can avoid a lot of grief at a later date. In one country where we worked, the project was very successful primarily because the ministry, the donor, and the major international organizations (especially WHO, the World Bank, and the European Union) all reached consensus early on and didn't waver in their commitments, despite the replacement of the original decision-makers with new ministers and new top-level staff in the partner agencies. Sadly, we have found that this level of agreement, partnership, and unwavering commitment is the exception rather than the rule.

Despite all the setbacks that inevitably occur with any project, it is imperative that advisors remain upbeat; the glass should always be half-full rather than half-empty. One advisor we knew, who had more than 30 years of international health experience, was an absolute pessimist; he had seen hundreds of well-intentioned projects fail over the years, and he could provide multiple reasons why every project being considered would also fail. We're certain he was right about some of those proposed projects, but there needs to be a certain level of optimism, or otherwise nothing new or innovative will ever be tried. Fortunately, the MOH didn't always follow his advice and was able to implement a number of successful initiatives that he had advised against.

CONCLUSION

All these ''principles'' and lessons learned are based on the experience of expatriate advisors with ministries of health. As MOH advisors are now increasingly more likely to be citizens of the countries they are advising, some of these principles will need to be revised or eliminated. But we believe many of them hold true, regardless of the nationality of the advisor. Although our experiences have been exclusively in developing countries, we also feel that many of the principles and lessons apply to many developed countries, as well.

The glass should always be half-full rather than half-empty.

We hope that these principles and the associated anecdotes will help those engaged in technical assistance in the health sector, so that their assistance is as effective as it can be and achieves the greatest possible impact. Some of these principles may be relevant to project design as donors try to maximize their return on investment.

The hardest task of all is to make donor-funded projects financially sustainable.

The hardest task of all for advisors and implementing partners alike is to make donor-funded projects financially sustainable. In 30 years of work as ministry advisors, we have not found any easy answer for that challenge. But we are optimistic about the future, as a new generation takes the helm in ministries of health around the world.

Acknowledgments: We would like to thank Dr. Barbara Timmons of Management Sciences for Health for her help in reviewing and commenting on the paper.

Competing Interests: None declared.

Peer Reviewed

Received: 2013 Aug 13; **Accepted:** 2013 Oct 8

Cite this article as: Solter S, Solter C. Providing technical assistance to ministries of health: lessons learned over 30 years. Glob Health Sci Pract. 2013;1(3):302-307. http://dx.doi.org/10.9745/GHSP-D-13-00121

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ORIGINAL ARTICLE

"A cup of tea with our CBD agent … ": community provision of injectable contraceptives in Kenya is safe and feasible

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Community health workers can safely provide the injectable DMPA when appropriately trained and supervised. We also found a fivefold increase in contraceptive uptake—a finding that builds on evidence from other countries for supportive policy change.

ABSTRACT

Background: In rural areas of Kenya, where the majority of Kenya's population lives, contraceptive use remains low compared with that in urban areas (37% vs. 47%). Inadequate access to family planning services in rural areas is partly due to fewer health facilities and the shortage of health care workers. Community-based access to injectable contraceptives can improve access for rural populations and expand the range of contraceptive methods available. Our pilot project sought to generate local evidence on safety, feasibility, and acceptability of the provision of injectable depot medroxyprogesterone acetate (DMPA) by community health workers (CHWs).

Design: We trained 31 CHWs in Tharaka District to provide injectable DMPA in addition to pills and condoms. Data were collected on family planning clients served by CHWs in Tharaka District as well as those who received services from health facilities from August 2009 to September 2010. Service statistics were collected from 3 pilot health facilities in the CHW service catchment area.

Results: In the 12-month study period, CHWs reached 1,210 women with family planning services including referrals for long-acting and permanent methods. Family planning use in the pilot sites for all methods increased an estimated fivefold, from 9% in facilities to 46% when facilities and CHWs were combined (32% for CHWs and 14% for facilities). The majority (69%) of clients served by CHWs chose DMPA. No client reported any signs of infection at the injection site nor did any CHW report needlestick injuries or other adverse events. The re-injection rate was 68% at the third visit, which compares favorably with other DMPA continuation studies. Two main reasons given for discontinuing were change of residence and temporary separation from spouse.

Conclusion: Community-based provision of DMPA along with other contraceptive methods increased the use of family planning and improved method choice during the study period. Injectable contraception provided by trained CHWs is a safe, acceptable, and feasible service delivery option in Kenya.

BACKGROUND

Kenya made significant gains in key reproductive health indicators between the late 1970s and the late 1990s, with the total fertility rate (TFR) declining from 8 to 5 births per woman and the contraceptive prevalence rate (CPR) increasing from 7% to 39% among currently married women. However, Kenya experienced stagnation in the CPR and little change in fertility rates in the period 2000 to 2010.

Contraceptive use remains low in rural areas (37%) compared with urban areas (47%). Use of pills in the urban areas is almost double that in rural areas (11% versus 6%), as it is for the intrauterine contraceptive device (IUD) (2.9% versus 1.2%). Injectable contraceptive use is at 23.5% in urban areas and 21% in rural areas, while implant use is 2.7% and 1.7%, respectively.[1]

These disparities could partly be a result of access. A majority (70%) of Kenya's population lives in rural

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areas where many people do not have adequate access to family planning services. Many live at considerable distance from the nearest health facility; when they do have reasonable access to a facility, services are often limited due to health care worker shortages.

Approaches such as community-based access to injectable contraceptives (CBA2I) can improve access for this population and expand the range of contraceptive methods available. CBA2I has been practiced in Asia since the 1970s, and more recently in Latin America and Africa. It is recognized as a safe, acceptable, and effective means to increase access to family planning method choices and to promote healthy birth spacing among underserved populations with poor access to health facilities.[2] The World Health Organization (WHO) now recommends optimizing health worker roles through task sharing, including CBA2I to improve access to key maternal and newborn health interventions.[3]

Community health workers (CHW) now provide injectable contraceptives in more than 10 African countries. Madagascar, Nigeria, Rwanda, and Uganda have revised their national reproductive health policy guidelines to allow CHWs to provide injectable contraceptives, and Malawi's and Senegal's Ministries of Health have agreed to support national provision of injectables by 1 cadre of CHWs.

With the realization that an improvement in reproductive health indicators can only be accomplished by involving the community, Kenya is currently focusing on building the capacity of the community to provide community-based health services. A recent study assessing the current family planning practices at the community level indicated that CHWs want to be trained to provide injectable contraceptives in order to provide their clients with a wider range of family planning services.[4]

Kenya's current strategy for delivering community-based health services allows community health workers to provide both family planning information and selected services.[5] These include counseling on all family planning methods and provision of methods such as condoms, pills, the Lactational Amenorrhea Method, and the Standard Days Method®.[6] However, the family planning guidelines do not allow community health workers to provide injectable contraceptives despite the method's clear popularity.

A CBA2I advocacy campaign began in Kenya in 2006 with sensitization efforts targeting key stakeholders in the medical field, such as medical professional associations and Ministry of Health (MOH) stakeholders at the provincial level. We conducted a study tour to Uganda in March 2007 to enable Kenyan stakeholders to learn from that country's experience. Stakeholders recommended a pilot project to determine CBA2I safety, feasibility, and acceptability in the Kenyan context as well as formation of an advisory committee to oversee implementation of the pilot. A project advisory committee (PAC) led by the MOH's Division of Reproductive Health (DRH) and comprising representatives from other organizations, including FHI 360, Jhpiego and the U.S. Agency for International Development's (USAID) AIDS, Population and Health Integrated Assistance (APHIA II) Eastern program, among others, was formed. The PAC identified Tharaka District as a suitable site for the pilot study for a number of reasons, including existence of an active community-based distribution program, willingness of the District Health Management Team (DHMT) to support the pilot, and poor access to health facilities. The Tharaka DHMT became an automatic member of the PAC once the site was selected. The PAC identified 3 health facilities to which CHWs would be attached, namely, Kibung'a Sub District Hospital, Kanyuru Health Center, and Rukenya Dispensary.

In Kenya's rural areas, where contraceptive use remains low, community-based injectable contraceptives could boost access and increase method choice.

The main purpose of the pilot was to generate local evidence to determine the safety, feasibility, and acceptability of community-based distribution of injectable depot medroxyprogesterone acetate (DMPA) by community health workers in Kenya. Despite existing evidence from other countries, such as Uganda, the Kenya MOH and stakeholders felt it was important to conduct a pilot to establish whether the same experiences could be replicated in Kenya.

METHODS

Pre-Implementation Procedures

The pilot study was implemented between August 2009 and September 2010. The CHWs completed training at the end of August 2009, and the majority started serving clients the following month, September 2009. The indicators for the pilot project were:

- Total number of family planning users (both clinic and CHW clients) in the intervention area prior to and during the pilot
- Number of returning DMPA clients served in the clinics to which CHWs were attached

- 12-month continuation rates for CHW clients using DMPA (as measured by the proportion of clients receiving an injection at 9 months)

Kenya stakeholders regard referrals as a key component of CHW work. They were therefore keen on CHWs not just providing the methods they had been trained on but also making referrals for other methods.

Other activities undertaken during implementation of the CBA2I initiative included identification of CHWs, development of training materials, training of CHWs, and monitoring and support supervision.

Community Health Worker Identification and Training

Extensive training prepared 31 community health workers to provide injectable DMPA along with other methods and to make effective referrals.

Representatives of the PAC led by the DRH, and in collaboration with local government officials, selected and trained 31 CHWs to provide DMPA in addition to the pills and condoms they were already providing. Selection criteria included residence in the study site, respect in the community, and at least 7 years of primary education (which was deemed the minimum amount of educational attainment necessary to facilitate comprehension of their tasks and the job aids provided). They also had to have previous CHW experience with provision of family planning services (counseling, condoms, and pills) at the community level.

The 31 CHWs underwent classroom and practical training for 3 weeks. Trainers included MOH trainers from the national, provincial, and district levels as well other PAC members. Classroom training, most of which was done in group-work format to enhance understanding, involved a review of all family planning methods. Rumors and misconceptions related to family planning were also discussed. A considerable amount of time was spent equipping the CHWs with counseling skills through role-play techniques. In addition, CHWs were also oriented to family planning checklists for ruling out pregnancy, providing contraceptive pills, and providing DMPA. The CHWs also learned about infection-prevention procedures, safe-injection techniques, appropriate record keeping, and effective referrals.

During practical training, substantial time was spent practicing injection techniques using tomatoes and oranges. The CHWs were divided into groups of 3 and each assigned a mentor to ensure they learned proper injection technique. Other teaching methods included, but were not limited to, demonstrations and return demonstrations (trainees' successful repetition of a technique previously demonstrated to them), case studies, lectures, and brainstorming. Materials used for training were a reference manual, participant manual, trainer's manuals, CHW job aids, re-injection calendars, and record-keeping tools.

Classroom and practical training were followed by a 2-week clinical practicum to allow CHWs to provide family planning services to clinic clients under the supervision of a nurse. The CHWs had to achieve pre-determined competence standards, including correct administration of at least 5 injections, before being certified to administer injections on their own.

Monitoring and Support Supervision

Two registered nurses supervised the CHWs; 1 nurse was in charge of 1 of the catchment area health facilities (4 CHWs) and the other nurse of the 2 remaining catchment areas (31 CHWs). The supervisors made at least 1 home visit to each of the CHWs but, due to time constraints, they scheduled supervision once per week at the health facility, where 2 CHWs could spend a whole day providing family planning services under supervision. When possible, the supervisors observed CHW service provision during the home visits. They also discussed with the CHWs any challenges faced during service provision and worked together with CHWs on plans to address these. The supervisors used a checklist to guide their discussion and recorded their observations.

The CHWs obtained their commodities and other supplies from the health facilities to which they were attached. Commodities and supplies for the pilot were made available through the normal district ordering system. The CHWs were trained to use a monthly tracking tool to order commodities and other supplies.

Apart from onsite supervision provided by the CHW supervisors described above, we undertook additional monitoring and support supervision on a monthly basis, later reduced to 1 visit every 2 months as the CHWs gained more experience in service provision and record keeping. We reviewed client records, the referral records, and the monthly tracking tool. We also compiled data on the project indicators during the visits. In addition, we compiled service delivery data from the 3 health facilities to which the CHWs were affiliated. The project team also took the opportunity to refresh CHW knowledge by asking questions about what was taught during training.

Data Collection Procedures

Recruitment of participants was continuous throughout the 12-month pilot period. Clients receiving DMPA injections were followed at 3, 6, and 9 months to monitor continuation rates. Process monitoring data were obtained from client tracking cards, referral cards, and family planning service statistics from the 3 facilities to which CHWs were attached.

The 3 indicators that formed the basis of data collection for the pilot project were:

- Total number of family planning users (both clinic and CHW clients) in the intervention area prior to and during the pilot
- Number of returning DMPA clients served in the clinics to which CHWs were attached
- 12-month continuation rates for CHW clients using DMPA (as measured by the proportion of clients receiving an injection at 9 months)

Data on the above indicators were collected by CHWs. The CHWs completed a tracking card for each client whom they served. Information recorded on the client tracking card included age of the client, method provided, type of user (whether new or returning), and any referral made. One tracking card per client was used to record all visits made within the pilot period. Data extracted from the client tracking card informed the first and the third indicators (total number of family planning users for the CHWs and 12–month re-injection and discontinuation rates). Service statistics from family planning registers at the 3 facilities to which the CHWs were attached contributed to the measurement of the first and second indicators (total number of family planning users for the health facilities and number of returning DMPA clients served in clinics to which CHWs were attached).

All data were entered, cleaned, and analyzed using Excel, version 97–2003. We did not seek ethical approval since the data to be collected came from process monitoring and not direct contact with clients.

RESULTS

Family Planning Users Served By Community Health Workers

Table 1 shows the number of family planning clients reached by CHWs by method and type of client. The pilot project reached 1,210 women in rural Tharaka with a range of family planning services. Two-thirds (69%) of these women either initiated or continued using DMPA through CHWs, and the rest were pill or condom acceptors or were referred for clinical methods. Of DMPA acceptors, 14% were new to family planning and 12% had switched to DMPA from oral contraceptive pills or other methods. CHWs initiated new DMPA clients using the appropriate family planning checklist. About three-quarters (74%) of DMPA clients who had previously received DMPA from a clinic opted to receive it from CHWs.

The results showed that CHWs made 34 referrals. Of these, 15% were for implants, 44% for IUDs, and 27% for female sterilization. A few clients (6%) were referred for side effects and other procedures (9%) such as pregnancy testing, cancer screening, and voluntary counseling and testing (VCT). The clients were referred to various health facilities, including the 3 facilities to which CHWs were attached: Tharaka District Hospital and Marie Stopes mobile outreach services.

Overall family planning use in the catchment area increased fivefold, from 9% at baseline to 46% when CHW provision (32%) was added to facility-based services (14%). (Overall family planning use was calculated using population census figures of women of reproductive age in the 3 pilot locations as the denominator and clinic service statistics and CHW records as the numerator.) At baseline, DMPA use in catchment areas was 6%, but it increased to 38% after adding CHW provision of this method (25% for CHWs, 13% for facilities).

When CHW provision was added to facility-based services, overall family planning use in the catchment area increased fivefold, from 9% to 46%.

Family Planning Users Served in Clinics

Table 2 presents the number of clinic clients accessing various family planning services in Kanyuru, Rukenya, and Kibung'a dispensaries 3 months before the study period and during the first 3 and last 3 months of CHW provision of DMPA. These facilities experienced an increase from 166 to 263 DMPA clients (new and returning) (58% increase) in the first 3 months of the pilot and a further increase to 341 clients (30% increase) at the end of the study period (6 months later).

It appears that contraceptive pills may have become slightly less popular compared with DMPA, as evidenced by the decrease in pill clients (new and returning) over the course of the pilot period.

Re-Injection

Table 3 shows the proportion of eligible clients who received a re-injection from a CHW. The

DPMA was the method of choice for 69% of women reached by CHWs.

TABLE 1. Family Planning Services Provided by CHWs, by Contraceptive Method and Type of Client (August 2009–September 2010)

Method	No. of clients	% of total clients (N=1210)	% of client type using method
Depo-Provera (DMPA)			
Former clinic clients	614	51	74
New to family planning	118	10	14
New to DMPA	100	8	12
Subtotals	**832**	**69**	**100**
Pills (including emergency contraceptives)			
New users	53	4	36
Returning users	96	8	64
Subtotals	**149**	**12**	**100**
Condoms			
New users	102	8	52
Returning users	93	8	48
Subtotals	**195[a]**	**16**	**100**
Referrals			
BTL	9	1	25
IUD	15	2	35
Implants	5	1	25
Side effects	2	1	6
Other	3	1	6
Subtotals	**34**	**3[b]**	**97[b]**
TOTAL	**1210**	**100**	

[a] 56% (109) of the condom users were dual method users.
[b] Percentage inexact due to rounding

Abbreviations: BTL, bilateral tubal ligation; CHW, community health worker; DMPA, depot medroxyprogesterone acetate; IUD, intrauterine contraceptive device.

re-injection rates were 89%, 81%, and 68% at 3, 6, and 9 months, respectively. The 12-month continuation rate of 68% compares favorably with other studies of DMPA continuation.[7]

Reasons for Discontinuation

As a secondary objective, we sought to determine reasons for discontinuation of DMPA services. The Kenya Demographic and Health Survey mentions side effects and desire to become pregnant as the 2 main reasons why clients discontinue use of DMPA.[8] In the pilot, the 2 main reasons given for discontinuing were changing residence and temporary separation from spouse. Other reasons included the desire to get pregnant and side effects. Some clients decided to discontinue DMPA use because of amenorrhea and/or desire to switch to another

TABLE 2. Clinic-Based Family Planning Services Provided Before and During the Pilot Intervention

Method provided	3 months before intervention (Jun–Aug 2009)	First 3 months of intervention (Sep–Nov 2009)	Last 3 months of intervention (May–Jul 2010)	Total
DMPA	166	263	341	**770**
COCs	59	12	29	**100**
POPs	4	1	3	**8**
Implants	4	0	0	**4**
IUD	0	3	0	**3**

Abbreviations: COC, combined oral contraceptives; DMPA, depot medroxyprogesterone acetate; IUD, intrauterine contraceptive device; POP, progestin-only pills.

TABLE 3. Re-Injection Rate Among CHW DMPA Clients

	Eligible Clients Receiving Re-Injections			
	1st re-injection (at 3 months) (n=761)	2nd re-injection (at 6 months) (n=672)	3rd re-injection (at 9 months) (n=508)	Reported related needlestick injuries (n=2453[a])
Tharaka pilot sites (31 CHWs)	89%	81%	68%	0% (0)

Percentages calculated among those clients who were eligible for a second, third, or fourth injection

[a] Total number of DMPA injections provided by all CHWs during the pilot period

Abbreviations: CHW, community health worker; DMPA, depot medroxyprogesterone acetate.

family planning method. Other clients chose not to receive their re-injection because their husband was away, and they felt they did not need contraception. A few clients who expressed an intention to continue with DMPA missed their re-injections due to flooded roads or other natural phenomena that prevented travel to the CHW's home. In the majority of these cases, CHWs were not able to reach clients to establish reasons for discontinuation.

DISCUSSION

Safe, Feasible, and Acceptable

The objective of the pilot study was to determine the safety, feasibility, and acceptability of CBA2I in Kenya. Safety was addressed by the occurrence and frequency of adverse events reported by the CHWs. Such adverse events included abscesses or needlesticks. Of the 2,453 injections provided by the CHWs, no cases of injection site infection or needlesticks were reported—an indication that the CHWs provided the services safely.

To address feasibility, the pilot study was implemented within existing MOH structures. Tharaka DHMT successfully implemented the pilot by putting in place supervision and other support systems including monitoring visits and provision of resupply. The pilot was deemed feasible because the DHMT provided full support and took the lead in all monitoring activities. To date, the DHMT has continued to support the CHWs and has indicated willingness to scale up to other areas once scale-up implementation guidelines are put in place.

The practice of CHW provision of DMPA was also found to be acceptable, as evidenced by the number of clients who were reached by the CHWs (N=1,210). About three-quarters (74%) of DMPA clients who had previously received

Since the CHWs were based in the community, they were able to follow up with the clients who forgot their re-injection dates.

DMPA from a clinic opted to switch to CHWs. This has the benefit of reducing the client burden on busy nurses and midwives, allowing them to better use their specialized clinical skills, while allowing a lower cadre to perform a more routine task.

While there is no single standard measure for the quality of community-based delivery of injectables, re-injection rate is a proxy measure for quality because it suggests a degree of client satisfaction with the method and services received. The 12-month continuation rate of 68% (measured by acceptance of a fourth injection at 9 months) seen in the study compares favorably with other studies of DMPA continuation. This reflects well on the ability and performance of CHWs as well as client satisfaction with the method and services. Since the CHWs were based in the community, they were able to follow up with the clients who forgot their re-injection dates, thus helping to enhance DMPA continuation.

In November 2012, the Kenyan government issued a new policy allowing trained CHWs to provide DMPA in hard-to-reach areas.

Another indicator of acceptability is the enthusiasm shown by clients of the CHWs, as illustrated by anecdotal information gathered by the monitoring team during their field visits:

> *The hospital is so far away; we waste time there and we have to carry our babies along, leaving work unattended.*
>
> *We can visit our CBD at any time, even on our way from the farm or market.*
>
> *These days, we take a cup of tea with our CBD agent as we discuss real family issues (sexuality, child health, STI, etc.).*

The Spill-Over Effect

During the pilot, CHWs referred clients to health facilities for longer-acting and reversible methods, and there appears to be a ''spill-over effect'' to non-family planning services, as seen in the net increase in deliveries by skilled birth attendants and immunization rates, as well as an overall increase in the uptake of family planning in the district hospital. The spill-over effect has been reported by the DHMT and may not be attributed entirely to the pilot.

Successful Policy Advocacy

Following the pilot project, we continued with advocacy efforts for scale up at the national level. Advocacy efforts included development of an advocacy brief summarizing findings of the pilot as well as the ''Spitfire Strategies'' advocacy approach introduced by the Gates Population Leadership group (led by Advance Family Planning [AFP] through Jhpiego) for MOH decision-makers. Advocacy messages were mainly aimed at creating a positive policy environment that favored allowing CHWs to provide injectable contraceptives.

To date, key medical associations including the Nursing Council of Kenya (NCK), the Midwives Chapter, and the National Nurses Association of Kenya have become supportive of the practice, and NCK has recommended initial scale up to 10 sites/counties where emphasis will be placed on standardization of training, regulation, and supervision. In addition to the key medical associations, we also reached key MOH personnel including the Chief Nurse Officer and the Director of Medical Services, who support the practice because of its approach to improving access for the hard-to-reach populations. Largely as a result of these efforts, the MOH in November 2012 issued an official policy statement allowing provision of DMPA by trained CHWs in hard-to-reach areas.

Acknowledgments: The Kenya pilot project was supported by the U.S. Agency for International Development.

Competing Interests: None declared.

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Peer Reviewed

Received: 2013 Apr 5; **Accepted:** 2013 Jul 30; **First Published Online:** 2013 Sep 30

Cite this article as: Olawo AA, Bashir I, Solomon M, Stanback J, Ndugga BM, Malonza I. ''A cup of tea with our CBD agent … '': community provision of injectable contraceptives in Kenya is safe and feasible. Glob Health Sci Pract. 2013;1(3):308-315. http://dx.doi.org/10.9745/GHSP-D-13-00040

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ORIGINAL ARTICLE

Building on safety, feasibility, and acceptability: the impact and cost of community health worker provision of injectable contraception

Dawn Chin-Quee,[a] John Bratt,[a] Morrisa Malkin,[b] Mavis Mwale Nduna,[c] Conrad Otterness,[a] Lydia Jumbe,[d] Reuben Kamoto Mbewe[e]

This project in Zambia contributes to our understanding of the impact of community-based provision of injectables on method choice and uptake and of the costs of adding DMPA to an established community-based family planning program. The project also illustrates the importance of involving stakeholders from the outset, analyzing costs relevant to scale up, and engaging in policy change dialogue not at the end, but rather throughout project implementation.

ABSTRACT

Background: A critical shortage of doctors, nurses, and midwives in many sub-Saharan African countries inhibits efforts to expand access to family planning services, especially in rural areas. One way to fill this gap is for community health workers (CHWs) to provide injectable contraceptives, an intervention for which there is growing evidence and international support. In 2009, with approval from the Government of Zambia (GoZ), FHI 360 collaborated with ChildFund Zambia to design and implement such an intervention as part of its existing CHW family planning program.

Methods: The safety of CHW provision of injectable DMPA (depot medroxyprogesterone acetate) was measured by client reports and by a 21-item structured observation checklist. Feasibility and acceptability were measured by interviews with CHWs and a subset of DMPA clients. The impact of adding DMPA to pill and condom provision was assessed by family planning uptake among the clients of trained CHWs from February 2010 to February 2011. Costs were documented using spreadsheets over the period November 2009 to February 2011.

Results: Scores were high on all measures of safety, feasibility, and acceptability. Couple-years of protection (CYP, protection from pregnancy for 1 year) was provided to 51 condom clients, 391 pill clients, and 2,206 DMPA clients. Of the 1,739 clients new to family planning, 85% chose injectable DMPA, while 13% chose pills and 2% chose condoms. Continuation rates were also high, at 63% after 1 year as compared with 47% for pill users. Incremental costs per couple-year were US$21.24 if 50% of users continue with CHW-provided DMPA.

Conclusion: The study affirms that the provision of injectable contraceptives by CHWs is safe, acceptable, and feasible in the Zambian context, with very high rates of uptake in hard-to-reach areas. High continuation rates among clients mean that costs of the intervention can be low when added to an existing community-based distribution program—a finding that is relevant to program replication (now underway in Zambia).

BACKGROUND

Many sub-Saharan African (SSA) countries face critical shortages of doctors, nurses, and midwives.[1] This deficit inhibits efforts to expand access to family planning services, especially in rural areas, where access to modern contraceptive methods is limited and few trained personnel are available to provide these services.

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Task sharing has been employed as a strategy to address this problem by delegating health care tasks that are usually carried out by doctors and nurses to a lower-level provider who is more accessible to the community. For example, the Government of Zimbabwe recently decided to increase access to antiretroviral treatment (ART) by authorizing trained nurses to prescribe drugs and manage patients in care.[2]

Many countries in SSA deploy lower-level cadres in different forms: as government or nongovernment-affiliated, as volunteers or salaried workers, with limited or wide-ranging responsibilities to the communities they serve. Just in the area of family planning, tasks assigned to community health workers (CHWs) can vary. For example, while CHWs in Rwanda are able to resupply clients with both pills and injectables only after a clinical evaluation, in Uganda they are able to initiate and resupply clients with hormonal methods. In Ethiopia, CHWs even insert implants.[3] Thus, CHWs can play an important role in providing family planning services. Moreover, success in Uganda, Ethiopia, and other SSA countries suggests that the role of CHWs need no longer be limited to distribution of condoms and oral contraceptive pills or referral to higher-level providers.

At a June 2009 technical consultation convened by the World Health Organization (WHO), the U.S. Agency for International Development (USAID), and Family Health International (now FHI 360), 30 technical and program experts from 18 countries reviewed evidence and experiences from programs using CHWs to expand access to injectable contraceptives. These experts concluded, ''Given appropriate and competency-based training, CHWs can screen clients effectively, provide DMPA (depot medroxyprogesterone acetate) injections safely and counsel on the side effects appropriately, demonstrating competence equivalent to facility-based providers of progestin-only injectables.''[4] With the conclusions endorsed by normative bodies such as the International Federation of Gynecology and Obstetrics, the United Nations Population Fund, the International Council of Nurses, and USAID, more countries in SSA initiated pilot studies, began implementing scale-up efforts, engaged in policy change dialogue, or realized policy changes that allow CHWs to provide injectable contraceptives.

More recently, WHO released a set of guidelines that define health worker roles for maternal and newborn health. These guidelines focus on task sharing among various cadres of health care providers to address the critical human resource shortages in many developing countries. Using the latest scientific evidence and the *Grading of Recommendations Assessment, Development and Evaluation* (GRADE) methodology, WHO endorsed the ''initiation and maintenance of injectable contraceptives'' by lay health workers using a standard syringe, provided that a strong monitoring and evaluation system is in place.[5]

As of August 2012, 13 countries in SSA were undergoing various stages of rolling out CHW provision of injectables.[6] Different paths were followed, as some governments changed policy first and then conducted pilot studies and scale up, while others began with pilots before considering scale up and policy change.[7] The impact of CHW-provided injectable contraception has been measured in countries such as Kenya, Madagascar, Malawi, Nigeria, and Uganda, where these programs reported expanded access to family planning services, increased uptake of family planning methods, reduced workload in clinics, and improved method continuation rates among DMPA users.[8,9]

A growing body of evidence supports the provision of injectable contraceptives by CHWs in hard-to-reach areas.

In Zambia, the process to gain approval for CHW provision of DMPA began with a request from the government to conduct a pilot study in hard-to-reach areas, where staff turnover also presents a significant problem. As in other SSA countries, use of family planning services among rural women in Zambia is relatively low; the contraceptive prevalence rate (CPR) for modern methods is 37%, compared with 48% in urban areas. Similarly, unmet need in rural areas is 28% (19% spacing, 9% limiting) versus 23% (13% spacing, 10% limiting) in urban areas.[10] In a July 2009 stakeholder meeting to discuss design of the pilot study, government officials and national stakeholders requested measures of program impact to be included, in addition to local confirmation of the safety, feasibility, and acceptability of CHW provision of injectable contraception.

With approval from the Government of Zambia (GoZ), FHI 360 collaborated with ChildFund Zambia, the local affiliate of ChildFund International (formerly Christian Children's Fund) to design and implement an intervention to introduce injectable contraception into ChildFund's existing CHW family planning program. The ChildFund CHW program has been in operation since 1987. In

addition to providing family planning services, ChildFund CHWs also deliver health education on personal hygiene and safe motherhood as well as sensitize the community—focusing on men—about family planning. CHWs are both men and women, with varying levels of secondary school education, who have been chosen by community members to provide basic services at the community level. They are volunteers but receive in-kind remuneration in the form of materials and equipment (bicycles, raincoats and boots, t-shirts, bags) and cost-shared animal restocking. Their initial family planning training, conducted over 2 weeks, uses the GoZ curriculum that also includes topics on clients' rights, anatomy and physiology, HIV/AIDS mode of transmission, family life education, male involvement, distribution and storage of commodities, and more. Although they work for ChildFund, these CHWs are affiliated with and supervised by GoZ health center staff (as well as ChildFund staff), from whom they obtain family planning commodities and to whom they submit records for inclusion in the district data management system.

With ChildFund's assistance, we also collected information on additional, or ''incremental,'' costs of adding injectable contraception to their ongoing CHW provision of condoms and oral contraceptive pills. As programs grapple with limited resources, such information is needed to estimate costs of scaling up and to establish that an intervention provides ''value for money.'' Thus, this paper not only presents results on the safety, feasibility, and acceptability of CHW provision of DMPA in the Zambian context, but it also focuses on the impact and costs of adding DMPA to an established community-based family planning program.

The study objectives were to:

- Assess CHW ability to provide DMPA injections to clients safely and effectively
- Assess acceptability of, and client and CHW satisfaction with, community-based delivery of DMPA
- Determine the impact of adding DMPA on family planning uptake and the proportion of pill and DMPA users continuing at 6, 9, and 12 months
- Determine incremental cost per couple-year of protection (CYP) of adding injectable contraceptives to the existing CHW program

METHODS

Overview

The safety of CHW provision of injectables was measured by DMPA client reports and by a 21-item structured observation checklist (SOC) divided into 2 scales that measured infection prevention (11 items) and injection procedures (10 items). The SOC was used during a clinic-based practicum. Feasibility and acceptability were measured by interviews with CHWs and a subset of their DMPA clients. The impact of adding injectable contraception to pill and condom provision was assessed by family planning uptake among the clients of trained CHWs from February 2010 to February 2011. Costs associated with adding DMPA to CHW-provided family planning services were documented, using spreadsheets, over the period November 2009 to February 2011.

Training and Data Collection

ChildFund Zambia selected Mumbwa and Luangwa districts—two of ChildFund's hard-to-reach, poor communities with limited access to health care services—to participate in the pilot study. Mumbwa has 34 health centers, 8 of which are in 6 communities served by CHWs involved in the study. Luangwa has 10 health centers and about 26 health units or health posts, 8 of which had CHWs involved in the study.

Preliminary estimates from Zambia's 2010 unpublished census put the population in Luangwa at about 25,000 and the 6-community ChildFund catchment area in Mumbwa at about 50,000 (out of a total district population of 218,328). The 8 health centers in Mumbwa affiliated with ChildFund CHWs are staffed by 17 providers, while the 8 health posts in Luangwa have only 12 staff members, reflecting a severe shortage of health care workers. Also, CHWs outnumbered Ministry of Health (MOH) staff in those catchment areas.

Forty practicing CHWs (20 from each district) affiliated with the 16 health facilities in Mumbwa and Luangwa were trained by master trainers from the MOH to safely provide DMPA injections in addition to the family planning services they already provided. CHWs received 5 days of didactic instruction on determining method eligibility (screening), counseling and informed choice, client referral, and provision of oral contraceptive pills, condoms, and DMPA.*

CHWs also completed a 2- to 4-week clinic-based practicum during which 6 or more DMPA injections had to be successfully administered before the CHW was allowed to provide injections unsupervised. We divided the 21-item structured observation checklist used by evaluators into its 2 main components and calculated a total score for safe injections with regard to infection prevention and to injection procedure. Evaluations of the first and last injections given by each CHW constituted the measures of safety.

The training and practicum were conducted on a staggered schedule in Luangwa and Mumbwa between December 2009 and January 2010. By February 2010, all CHWs were certified and their capabilities introduced to their respective communities at an official graduation ceremony involving local leaders and ChildFund representatives. CHWs were then asked to record all provision of condoms, pills, and injectables to their family planning clients for 13 months—distinguishing between new acceptors, switchers, and continuing users of all methods—using ChildFund Zambia's family planning register, modified to include DMPA.

The study team—comprising FHI 360, ChildFund Zambia, and Ministry of Health staff, the Family Planning Technical Working Group (FPTWG),[†] and other stakeholders—selected the following measures of impact:

1. Family planning method uptake (expressed in couple-years of protection or CYPs[‡])
2. Proportion of CHW clients who are new family planning and new DMPA acceptors
3. Indicators of family planning method continuation by CHW pill and DMPA clients
4. Comparisons between CYPs provided by study CHWs and CYPs recorded by District Health Offices (DHOs)

Approximately 9 months into data collection, we interviewed all CHWs and a subset of their DMPA clients (n=253) who received their first injection from a CHW between February and April 2010. By then, CHWs had performed several months of DMPA administration, and enough time had elapsed for these initial DMPA users to receive up to 3 injections from a CHW.

Study methods included checklists to measure safe provision, interviews with CHWs and clients, and cost analyses.

ChildFund Zambia also selected 6 male employees—3 assigned to each district—to personally retrieve family planning data on a monthly basis from the 40 CHWs. These men (given bicycles for transportation) were engaged specifically to cover the distances to and from CHWs' homes, discuss and verify data with the CHWs, and transfer the required information from the family planning register to the data retrieval form developed for the study. This form collected information on:

- Method received/used on the first visit in study period
- Whether the client was a continuing user or new family planning acceptor[§]
- Previous method used
- Number of pill cycles or condoms distributed and the scheduled re-injection date for DMPA clients over the course of the 13-month data collection period

The 6 data retrievers received instruction from the Lusaka-based project coordinator on use of the data retrieval form and the family planning client register. Data retrievers also met with the project coordinator monthly for the first half of data collection, then every 2 to 3 months thereafter to verify the accuracy of the information and to submit CHW family planning uptake data from February 2010 to February 2011.

We also obtained family planning statistics for pills, condoms, and DMPA distribution from the District Health Offices in Luangwa and Mumbwa for the same 13-month time period. These statistics reportedly included both health facility and CHW provision of family planning methods. All analyses were performed with SAS 9.2.[11]

*The training materials used in 2009 can be accessed at: http://www.k4health.org/toolkits/cba2i/sample-community-health-worker-training-curriculum. However, the content has since been updated to emphasize dual protection to prevent STIs/HIV and a 13-week DMPA re-injection window. Originally the Zambia MOH was following a 12-week policy.

[†] The FPTWG comprises all local stakeholders interested/involved in family planning, including the Zambia MOH, UNFPA, WHO, USAID, JSI (John Snow, Inc.), ZISSP (Zambia Integrated Systems Strengthening Program), Marie Stopes International, PPAZ (Planned Parenthood Association of Zambia), CHAZ (Churches Health Association of Zambia), World Vision, CDC, SFH (Society for Family Health), and Boston University.

[‡] CYP is the estimated protection provided by contraceptive methods during a 1-year period. Our estimates were based on USAID conversion factors for units of condoms (120 per CYP) and pill packs (15 cycles per CYP) distributed, and DMPA injections received (4 doses per CYP). CYPs are not routinely calculated by ChildFund and were computed solely to meet the objectives of the study.

[§] During the data collection period, no women stopped and restarted a method after 6 months; we did not determine upon recruitment if continuing users entering the study had restarted a method after 6 months.

Assessment of Incremental Costs of Adding DMPA to the CHW Program

The approach to costing the addition of a health service intervention to an existing program is to concentrate on additional or ''incremental'' costs only, since costs of the existing program would have been incurred even without the intervention. Incremental costs of an intervention can be classified according to 3 phases: 1) planning/designing the intervention; 2) preparing for service delivery; and 3) delivering the new or improved services. Each phase comprises a set of activities, and each activity uses resources, such as time of trainers and providers and medical supplies and equipment. When costs are attached to resources used in the intervention, the total incremental cost of the intervention may be calculated. Stakeholders may be more interested in costs of activities relevant to scaling up, giving less emphasis to costs in the planning and design phase. In our study, these activities included the following:

1. The training of trainers (ToT) workshop that trained 10 trainers, of which 4 were used for the CHW training courses in Luangwa and Mumbwa
2. The CHW training consisting of 2 workshops, each of which trained 20 CHWs
3. The CHW practicum, which included trainee meal allowances and transport refunds for CHW visits to clinic facilities for mentoring and practice in injection technique
4. Supervision of CHWs, which took place in 2 stages: an intensive initial stage where interactions were more frequent and longer in duration and a second phase in which supervisors checked in with CHWs during routine site visits
5. Overall intervention management by ChildFund staff, who oversaw all activities related to the intervention
6. DMPA commodities, including vials, syringes, cotton, soap, and sharps boxes

We used key informant interviews, record reviews, and periodic progress reports to identify all intervention-related activities and resources, and we designed Excel-based spreadsheets to organize information on the costs of these resources. Most costs reflect actual expenditures, except for personnel costs, which were estimated using MOH salary scales for positions considered to be equivalent to those of research and project staff who implemented the intervention.

Incremental cost per CYP of CHW provision of DMPA was calculated by dividing the annualized incremental cost of the intervention (that is, costs adjusted for the period of the study) by the number of CYPs attributable to the CHW intervention. This indicator provides a sense of the value of resources needed to protect 1 couple from pregnancy for a year through DMPA provided by CHWs in ChildFund's program.

FHI 360's Protection of Human Subjects Committee and ERES Converge Ethical Review Board in Zambia reviewed and approved this study.

RESULTS

Safety of DMPA Provision by CHWs

On the 11-item scale on infection prevention procedures, CHWs initially carried out about 9 of the items, or 82%, on average. At their final assessment, the average score increased to a perfect 11, or 100%. Thus, there was improvement from the first to the last DMPA injection evaluated during the practicum, but the starting point was high to begin with.

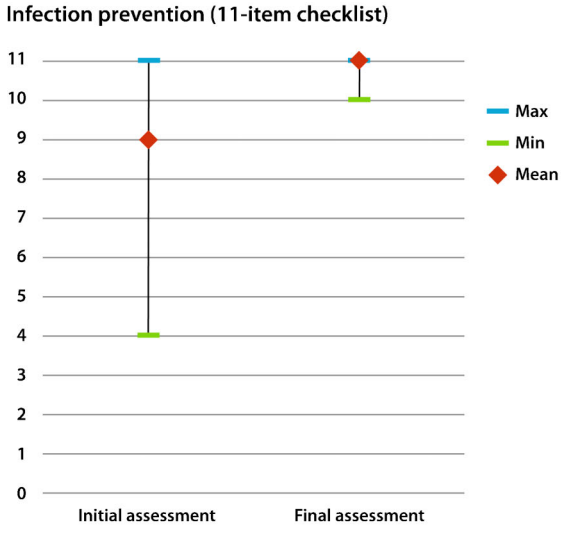
For the 10-item injection procedure scale, the initial average score was 7.4, and at final assessment the score was 9.6. Again, there was improvement, but it is important to note that CHWs who scored low in the initial assessment improved markedly by the last assessment. This is captured by the narrowing of the range of scores from the initial to the final assessments for both infection prevention and injection procedure (Figure 1).

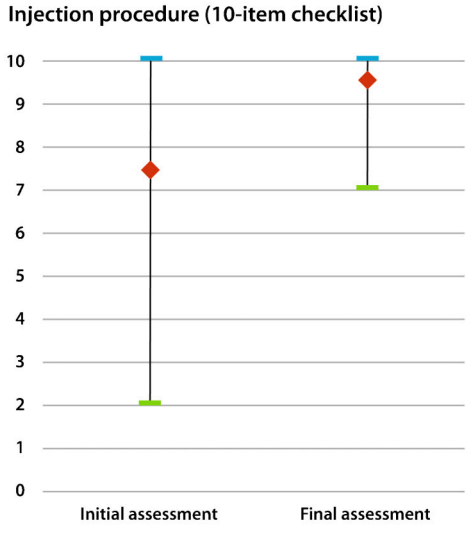
Only 6 (2%) of the 253 DMPA clients interviewed after 9 months of data collection reported any problems with CHW-provided injections. Three could not describe the problem, 2 reported pain at the injection site, and 1 client described numbness in the arm. There were no reports from clients of abscesses or infections. During monitoring and supervision activities conducted by ChildFund throughout the study period, CHWs also reported to ChildFund and MOH supervisors that they had not found any abscesses or infections.

Acceptability of Method to Clients

The acceptability of DMPA and CHW-provision of the method was ascertained by interviews with 253 clients:

FIGURE 1. Safety of CHW Provision of Injectables





1. Washes hands well with soap and water
2. If skin is dirty, cleans injection site with water-soaked cotton ball
3. Double-checks the bottle for content, dose, and expiration date
4. Rolls bottle between palms or shakes gently
5. Opens sterile package for syringe/needle (attaches needle if needed)
6. Expels air from syringe
7. Locates the exact site for injection
8. Inserts needle straight into the muscle
9. Injects the entire contents of the syringe
10. Places the used syringe into the sharps container
11. Washes hands with soap and water

1. Describes injection procedure for client
2. Asks client where she would like to receive the injection
3. Dries hands with a clean towel or lets them air-dry
4. Removes plastic cap from bottle
5. Fills syringe with contents of the bottle
6. Gently presses the injection site with a clean cotton ball
7. Instructs the client not to massage the site
8. Arranges for re-injection visit in 13 weeks
9. Encourages client to return if there are any questions or concerns
10. Records information on client card and other data collection forms

Abbreviations: CHW, community health worker.

- 94% were very much satisfied with DMPA as a family planning method
- 93% wanted to get another DMPA injection
- 94% of CBD clients who accepted DMPA between February and April 2010 received a second DMPA injection
- 99% wanted to receive their next injection from a CHW
- 98% were satisfied with the way the CBD agent gave them their injection
- 98% would recommend receiving a DMPA injection from their CBD agent to a friend

Of the 7% of DMPA users who did not want another injection, the main reasons mentioned were desire to have a child (35%), side effects or problems with DMPA use (35%), and husband's disapproval (18%). For the 4 women (1.6%) who could have but did not receive a second injection, the reasons were dissatisfaction with side effects (n=2) and husband's disapproval (n=2). Thus, CHW provision of DMPA and the method itself proved highly acceptable.

In interviews with the 40 CHWs, 98% reported that it was easy to find women who were interested in receiving DMPA, and 80% felt that it was easy to gain the confidence of the community in their ability to provide DMPA. Although 89% said that their workload increased due to the addition of DMPA to their family planning services, they reported that the increase was acceptable and not a burden.

Characteristics of Acceptors and Family Planning Uptake

Data on family planning method uptake were recorded for a total 4,241 family planning clients in both districts during the 13-month data collection period. The average age of women was 28, with a range of 15 to 53 years. Clients had an average of 3.6 living children, with a range of 0 to 14 children.

Based on provision of methods by ChildFund CHWs from February 2010 to February 2011, 51 condom clients, 391 pill clients, and 2,206 DMPA clients would be protected from pregnancy for 1 year. Uptake of condoms, pills, and DMPA was greater in Mumbwa than Luangwa, as the majority of family planning clients (73%) were from Mumbwa district, the more populous area, with a higher contraceptive prevalence rate (40% vs. 27%).[10] In both districts, condoms conferred the fewest CYPs, while DMPA conferred the most (Table 1).

Uptake results showed an overwhelming preference for injectable DMPA over pills and condoms.

With regard to new acceptors, 41% of CHW clients during the 13-month period were new to family planning. In this group of 1,739 women, 85% chose DMPA, 13% chose oral contraceptive pills, and the remaining 2% chose condoms as their first family planning method. Of the continuing users, 63% reported using pills, 30% DMPA, 6% condoms, and the rest unspecified. Of all the family planning clients in the study, 82%, or 3,479 women, obtained DMPA from a CHW some time between February 2010 and February 2011. About 20% were continuing clients who were formerly clinic clients, and 24% were former pill and condom users who switched to CHW-provided DMPA.

Continuing Method Use for Pills and DMPA

To determine continuing method use, we examined data from women who obtained DMPA or pills from CHWs during the study who had the opportunity—based on when they started—to use DMPA or pills for 6 months, 9 months, or 12 months (Figure 2). Continuation for DMPA users was always higher than for pill users (using mutually exclusive groups of women with 6, 9, and 12 month follow-up data), with a significant difference noted at the 12-month mark—63% vs. 47% (Chi-square $P<.001$).

Comparison of District Health Office Statistics with CHW Uptake Data

Figure 3 compares CYP data from district-level statistics (which include both clinic and CHW inputs) with records from the ChildFund Zambia CHWs participating in Luangwa and Mumbwa. It is clear from the comparison that many more condoms are provided at the clinic than at the community level, while pill and DMPA provision by the 40 CHWs accounts for about half of the CYPs documented by 34 health centers in Mumbwa and 10 in Luangwa.

Incremental Cost of Intervention and Per CYP

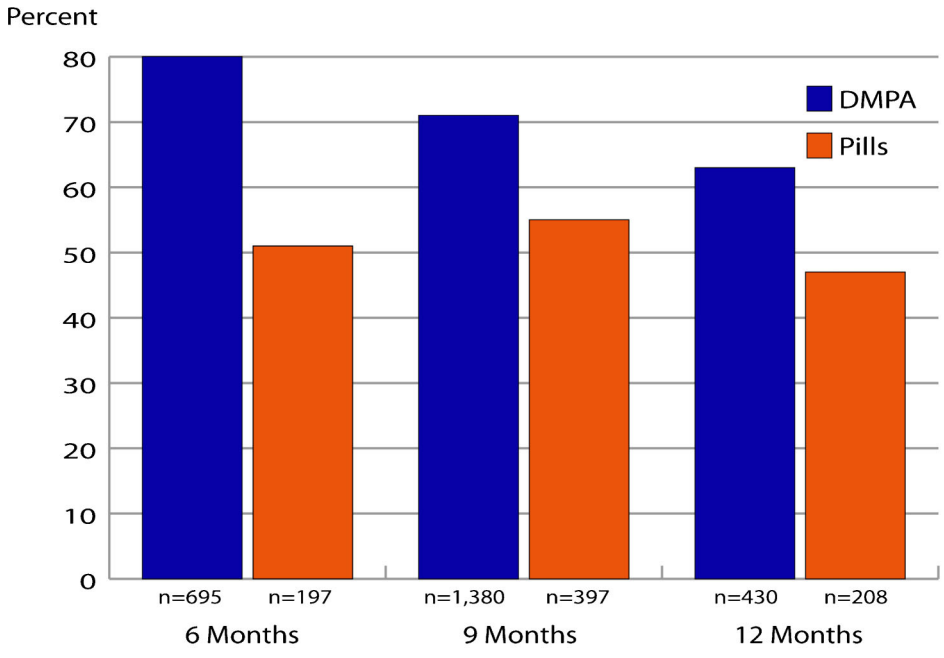
Table 2 reports incremental costs of intervention activities relevant to future scale up. The total incremental costs were US$37,300 (in 2010 dollars), while the annualized costs adjust some of the cost items to reflect that their effects would extend beyond the initial year of the intervention. For example, the ToT workshop produced 10 persons capable of training CHWs to provide DMPA, but only 4 of them participated in the pilot; therefore,

TABLE 1. Couple-Years of Protection (CYP) by CHW-Provided Methods in Study Districts, February 2010 to February 2011

	Districts		
CYP provided by:	**Luangwa**	**Mumbwa**	**Total**
Condoms	13	38	**51**
Oral contraceptive pills	96	295	**391**
Injectable DMPA	727	1,479	**2,206**
Total	**836**	**1,812**	**2,648**

Source: FHI 360 Data Retriever Registers
Abbreviation: CHW, community health worker; DMPA, depot medroxyprogesterone acetate.

FIGURE 2. Continued Use of Methods Obtained From CHWs



Abbreviations: DMPA, depot medroxyprogesterone acetate.

Source: FHI 360 Data Retriever Registers

only 40% of the ToT costs are applicable to the pilot. For both training activities, the effects are assumed to last for 2 years (requiring periodic refresher training), and so we applied one-half of the training cost (including practicum expenses) to the 1-year period of service delivery in the pilot program. Other activity costs are unchanged. The estimate of annualized incremental cost (which also serves as the numerator of the incremental cost per CYP ratio) was US$24,322.

The denominator of the cost per CYP ratio reflects the number of CYPs that can be attributed to the intervention. All CYPs (373) from new DMPA acceptors are included, along with 20 additional CYPs that represent increased contraceptive protection contributed by women who switched to DMPA from the less effective pills and condoms. The remaining CYPs (1,813) can be attributed to the intervention if we assume that these continuing users would not have returned to the clinic for DMPA services. Figure 4 shows the cost per CYP that can definitively be attributed to CHW provision (US$61.89) and the change in cost per CYP at different levels of DMPA continuation. If we assume that 50% of existing DMPA users continued with their method solely because of the improved access afforded by CHW provision, cost per CYP would be lower, at US$21.24. If all users continued because of CHW provision, cost per CYP would be US$11.03.

DISCUSSION

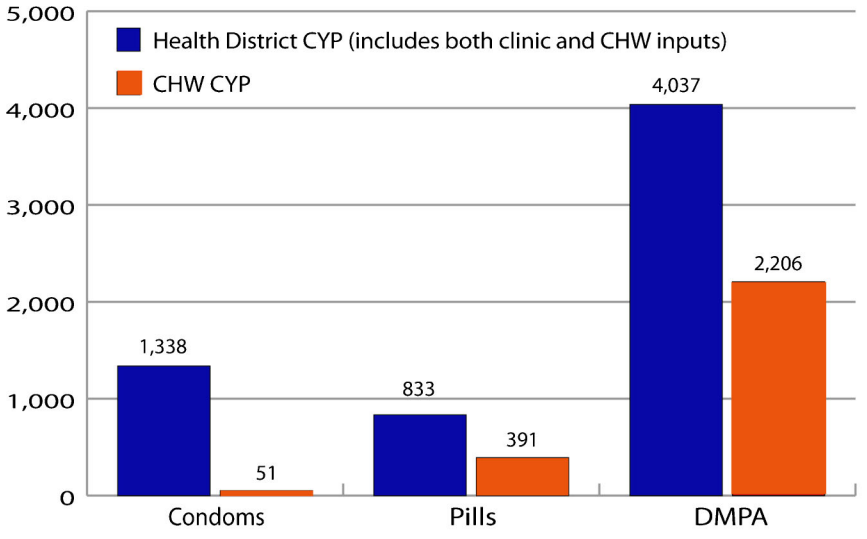
Safe, Feasible, and Acceptable

This pilot study contributes to the body of evidence on CHW provision of injectable contraception. As detailed in the Results section of this article, the findings establish the safety, feasibility, and acceptability of CHWs providing DMPA in the Zambian context.

Impact on Method Use and Choice

The findings also demonstrate the impact of providing DMPA through CHWs on method use and choice, namely that a sizable number of women became new acceptors of all the methods provided

FIGURE 3. Couple-Years of Protection (CYP), February 2010 to February 2011



Abbreviations: CHW, community health worker; DMPA, depot medroxyprogesterone acetate.

by CHWs. Women were also able to switch to a more desirable method and/or service delivery setting.

Other Factors Affecting Uptake

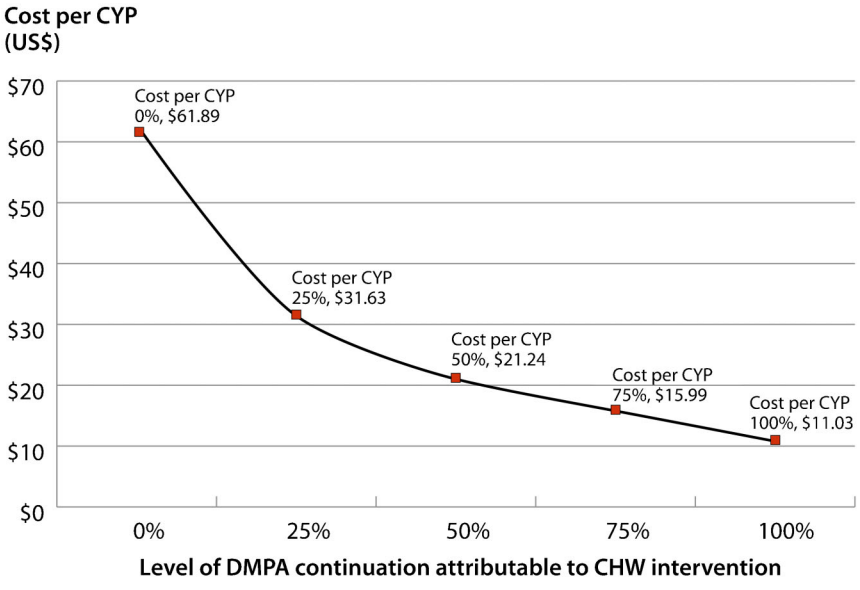
The project cannot take full credit for the increase in DMPA use in the 2 districts following initiation of the pilot study since the method was also available at 44 health clinics. However, it was a noteworthy increase, made all the more striking by the fact that provision by the 40 CHWs accounted for more than half of the CYPs reported by the District Health Offices from

TABLE 2. Total and Annualized Incremental Costs of the Intervention (4,600 Zambia Kwacha = US$1)

Intervention Activity	Total Cost (US$)	Annualized Cost (US$)
Training of trainers (N=10)	5,103	1,021
Training of CHWs (N=40)	12,964	6,482
Practicum expenses	4,827	2,414
Supervision of CHWs	3,334	3,334
Overall intervention management	3,219	3,219
DMPA commodities	7,853	7,853
Total incremental cost[a]	37,300	24,322

[a]As noted, these estimates do not include costs of planning and design, because these are one-time activities that would not be repeated in scale up.
Abbreviations: CHW, community health worker; DMPA, depot medroxyprogesterone acetate.

FIGURE 4. Cost Per Couple-Year of Protection (CYP) at Different Levels of DMPA Continuation Attributable to CHW Intervention



Abbreviations: CHW, community health worker; DMPA, depot medroxyprogesterone acetate.

Community-based provision of DMPA allows health center personnel more time to provide services at their higher level of training.

February 2010 to February 2011. This proportion reflects a shortage of health center workers, who were outnumbered by the CHWs, but also points to a pent-up demand for DMPA and women's desire for easier access to this very popular method.

Additional Benefits of CHW Provision

The benefits of serving clients at the community level go beyond the increase in DMPA use. For example, it can lighten the burden in health centers, leaving nurses more time to provide services that require a higher level of training. For their part, CHWs can learn new skills and build capacity by bringing expanded family planning services to the community. For clients, the reduction in travel and wait times and better access to family planning, including DMPA, can result in fewer women lost to follow-up. Indeed, the use of CHW-provided DMPA at 12 months in this study is significantly higher than that for oral contraceptive pills and is slightly higher than the worldwide norm: typical 1-year continuation rates for DMPA (and pills) are usually between 50% and 60%.[12]

Cost

Since, as stated above, we do not know the true impact of CHW provision on continuing use of DMPA among family planning users who initiated at clinics, we cannot say with certainty whether the incremental cost per CYP is closer to US$61 or to US$11. Our results showed that cost per CYP declines rapidly with small increases in the proportion of users for whom the convenience of CHW resupply improves DMPA continuation. If we apply the 12-month proportion of continuing DMPA use for CHW-initiated clients (63%), this would suggest an incremental cost per CYP of approximately US$16. Is US$16 per CYP indicative of good value for money? This is difficult to gauge, because comparative data are lacking on cost per CYP for DMPA delivery in other contexts. A recent study in Kenya[13] estimated facility-based cost per CYP for injectables at US$8.55 to $12.69. Considering that ChildFund's CHW program is reaching women who might not otherwise attend facilities, a US$4 to $8 premium per CYP for bridging the access barrier could be considered good use of scarce resources.

High continuation rates suggest the costs of the intervention can be low—good news for program scale up.

BOX. From Research to Program Implementation

Strong Stakeholder Leadership

In May 2011, the Zambian MOH convened a meeting to present the results of the study on the safety, feasibility, and acceptability of DMPA provision by CHWs, to discuss the implications of the results, and to chart the way forward. The FPTWG had helped sustain interest in the pilot study by disseminating progress reports, acting as liaison between the research team and the MOH, and helping to reduce obstacles throughout study implementation. The MOH agreed to continue service delivery in the pilot districts without interruption, to revise the National Health Policy to allow provision of DMPA by CHWs, and to develop a ''Road Map for National Scale Up'' document. ''The Road Map,'' drafted by the MOH and partners, was endorsed by a larger group of stakeholders in October 2011.

With support from USAID/Zambia, preparations for the first phase of scale up began in October 2011, with activities beginning in January 2012 that included continued service delivery in the pilot sites, expansion to new sites within the pilot districts, and expansion to new sites in 1 new district (Nyimba). FHI 360 and ChildFund conducted qualitative and quantitative monitoring and evaluation activities, provided technical assistance to the MOH and the Ministry of Community Development, Maternal & Child Health, and facilitated dialogue among stakeholders regarding the policy change to permit CHWs to administer DMPA. In the early scale-up phase, 72 CHWs were newly trained to administer DMPA and now are providing family planning services to their communities.

Ministry-level support for scaling up community-based provision of DMPA was very strong in the immediate post-study phase. This was due in large part to deliberate efforts to engage key stakeholders and influence decision makers from the earliest stages of the research process in 2009 and to maintain that engagement throughout the entire study. Without such concerted efforts to involve stakeholders from the beginning of the study—and the FPTWG's pivotal role in recommending policy changes and scale up in Zambia—it is unlikely that the translation of this study's findings into practice would have occurred so rapidly.

Study Tour to Sustain Momentum

However, the general elections immediately following the October 2011 stakeholder meeting led to changes in leadership within the MOH and the creation of a new Ministry of Community Development, Mother & Child Health. These changes decelerated the momentum of the early scale-up process. FHI 360, ChildFund Zambia, and USAID/Zambia worked to orient new leadership to the project and cultivate a renewed sense of ownership. As part of these efforts, a delegation of Zambian stakeholders traveled to Rwanda for a south-to-south tour to observe Rwanda's robust community-based family planning program and engage with stakeholders around important policy-level and operational issues. The study tour effectively improved country-level ownership of the replication process and allowed professional bodies, donors, implementers, and key personnel from both ministries to learn from Rwanda's experience and develop plans for moving ahead with CHW provision of DMPA in Zambia. Many stakeholders are strongly advocating a policy change in 2013.

Replicability to Other Settings

It should be noted that this pilot study was implemented within an established CHW program, operated by an NGO that already had a family planning program in place, and with clients who actively sought these services from their CHWs. As such, the intervention was carried out in what could be considered an ideal setting. For that reason, our positive results may not be replicable to the same degree, especially if similar conditions and political will are absent. Nevertheless, this pilot demonstrated: 1) the value of investing in a program where the need for DMPA is ably addressed by a trained cadre of lower-level family planning providers, and 2) the successful expansion of CHW provision of DMPA through effective and continuous collaboration of research, practice, and advocacy.

Sustaining Commitment

In Zambia, the potential for this practice to be widely replicated and sustainable is increased in part by a resurgent global interest in family planning. Country-level commitments and support arose out of the highly visible 2012 London Summit on Family Planning. Among them, the GoZ pledged to increase contraceptive prevalence through various strategies, including reducing barriers to task sharing and doubling budget allocations for family planning. Most recently at the 2013 Women Deliver conference, the First Lady of Zambia, Her Excellency Dr. Christine Kaseba-Sata, emphasized her commitment to creating a supportive environment for task sharing and ensuring the scale up of CHW provision of family planning, including DMPA. Scale up has already begun in 3 districts with USAID/Zambia funding and is expected to continue, with appropriate adaptations that will facilitate large-scale expansion, especially as government ownership and funding increase.

Indications of Future Demand

Prospects for increasing CHW-initiated and resupplied DMPA in Zambia are very promising. (For a description of the scale-up work already underway in Zambia, see the box.) Once the word spread that certain CHWs were providing DMPA, women flocked to them for the method, including residents of Nangoma, Mumbwa, where the health center is affiliated with the Catholic Church and family planning services are not provided. In Luangwa, some women (not included in our data capture) came to our trained CHWs from neighboring Zimbabwe and Mozambique, since the GoZ provides these services free-of-charge to anyone. Therefore, it was easy for CHWs to find women who wanted to use DMPA.

LIMITATIONS OF THE STUDY

As is often the case, family planning statistics obtained at the district level may be incomplete, but to the best of our knowledge all health centers in the districts were included. Nevertheless, it is possible that not all clinics and all CHWs reliably and consistently submitted their monthly forms to the DHO for the time period under study. As such, the data may underrepresent the true contributions of clinics and/or CHWs who were not involved in the pilot.

Acknowledgments: Financial assistance was provided by USAID under the terms of Cooperative Agreement GPO-A-OO-O8-OOOO1-OO, Program Research for Strengthening Services (PROGRESS).

Competing Interests: None declared.

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Peer Reviewed

Received: 2013 Mar 13; **Accepted:** 2013 Jul 5; **First Published Online:** 2013 Oct 9

Cite this article as: Chin-Quee D, Bratt J, Malkin M, Nduna MM, Otterness C, Jumbe L, et al. Building on safety, feasibility, and acceptability: the impact and cost of community health worker provision of injectable contraception. Glob Health Sci Pract. 2013;1(3):316-327. http://dx.doi.org/10.9745/GHSP-D-13-00025

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ORIGINAL ARTICLE

Understanding where parents take their sick children and why it matters: a multi-country analysis

Stephen Hodgins,[a] Thomas Pullum,[b] Leanne Dougherty[c]

To effectively reach children with potentially life-threatening illness with needed treatment, it is important to understand where parents seek care. Data from 42 DHS and MICS surveys conducted since 2005 show that a majority of care in Africa is sought from the public sector; in South Asia, from the private sector; and in Southeast Asia, from a public-private mix. We recommend that such data be made available in standard DHS and MICS reports.

ABSTRACT

Background: Developing effective context-specific strategies to ensure that a high proportion of children receive timely and appropriate care requires knowing the source from which care is sought. Although Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) collect such data in disaggregated form, they are not made available in the standard DHS and MICS reports.

Methods: Secondary data analysis was done on 42 DHS and MICS surveys conducted since 2005 for care seeking for acute respiratory illness (DHS and MICS), diarrhea (DHS only), and fever (DHS only), disaggregating by urban-rural settings. Eight categories were used for source of care. Stata, version 12, was used for the analysis.

Results: Patterns varied considerably, with care seeking in most of sub-Saharan Africa predominantly from public-sector providers, in South Asia predominantly from the private sector, and in Southeast Asia from a mix of public and private sources. Community health workers were not an important source of care.

Conclusions: Variation in care-seeking patterns has implications for effective strategy, as described in more detail in 5 country examples from Asia and Africa. The analysis also suggests that it may be inappropriate to focus program efforts on community health workers to the exclusion of more widely used sources of care. The authors argue that, in order to ensure sounder program approaches, disaggregated care-seeking data should be routinely included in DHS and MICS reports. Finally, the authors call for more data on actual care provided in order to improve quality of care.

BACKGROUND

In less-developed countries, pneumonia and diarrhea remain the leading causes of deaths among children beyond the newborn period; in many sub-Saharan African countries (particularly in West Africa), they are joined by malaria as a major cause.[1] Preventive interventions are available for each of these conditions, but timely and appropriate *treatment* remains a fundamentally important program element. The key first steps in its successful delivery are recognition by the caregiver and care seeking outside the home.

In order to develop child survival strategies that effectively address the need for treatment of potentially life-threatening childhood illness, program managers need to understand the populations they work with. Indeed, it is to those developing and managing child health programs, particularly at the country level, that this paper is primarily directed. They need answers to key questions:

- To what extent are caregivers recognizing illness and seeking outside care?
- When they do seek outside care, where do they go?
- When care is sought, what actual treatments are received?

With such information, program managers are better enabled to develop strategies that respond to the challenges of their specific settings.

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The Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) have long included questions on child illness and care seeking. Questions are asked to elicit a recent history of cough, fever, and diarrhea. For each of these 3 categories of illness, the caregiver is then asked if advice or treatment was sought outside the home and, if so, from what source. In standard DHS reports, the one way this information is used is to generate an indicator for ''care seeking from an appropriate provider.'' The numerator for this indicator consists of cases for which advice or treatment was sought from a category of provider considered able to provide competent care (health facility or professional health worker). However, although the DHS (and MICS) data sets include details on specific sources of care, this is not presented in the standard reports. This is unfortunate because such information is needed to develop strategies that respond to the actual situation on the ground, with respect to current source of care.

This paper reports on a secondary analysis of standard DHS surveys conducted in sub-Saharan Africa, South Asia, and Southeast Asia since 2005–2006 (excluding small-population island nations), and of MICS surveys conducted over the period 2005–2008, providing a disaggregated picture of care seeking for cough, fever, and diarrhea.

METHODS

The data come from surveys conducted by Measure DHS, a project of the Bureau for Global Health at the U.S. Agency for International Development (USAID), and by the United Nations Children's Fund (UNICEF). All of the data sets are available online (at www.measuredhs.com and www.childinfo.org), along with country reports that include basic analyses of child health data, the questionnaires, and other documentation.

Information about treatment for possible acute respiratory infection (as this is operationalized in DHS and MICS studies) was reported for an average of 695 children in 24 DHS surveys, a total of 16,682 children, and in an additional 13 MICS surveys (with an average of 288 children for a total of 5,878 children). Fever was reported for an average of 2,295 children from 29 DHS surveys, a total of 66,549 cases. Information on diarrhea comes from the same 29 surveys, with an average of 1,369 children under 5 reporting diarrhea symptoms in the past 2 weeks in each of the surveys, giving a total of 39,393 cases.

Although advice or treatment-seeking questions were equivalent in the 2 survey types for acute respiratory infection (ARI), they were not for diarrhea and fever. MICS questions did not ask where the mothers sought advice or treatment, and questions focused instead on *sources for specific treatments*. For diarrhea, the MICS asked, ''Where did you get the ORS [oral rehydration salts] packet?'' For fever, the survey asked, ''Where did you get the anti-malarials?'' Because of this lack of comparability with the DHS questions, analysis on care seeking for diarrhea and fever was done using only DHS data.

Child health program managers need answers to key questions about care seeking in order to respond effectively to the challenges of their specific settings.

The *structure* of the portion of the questionnaire on care seeking was essentially the same in all surveys (for ARI, in both DHS and MICS, and for diarrhea and fever in DHS). The options for *place of treatment* were similar but not identical: in each of the surveys, specific types of health facility or provider, both formal and informal, thought to provide at least some sick-child care in that country setting were included as possible response categories. Because these categories varied across surveys, for our purposes it was necessary to form a set of general categories to which these responses could be mapped:

- Public-sector hospital
- Public-sector peripheral health facility (non-hospital), including mobile/outreach clinics
- Private-sector health professionals, clinics, and hospitals
- Community health workers
- Services provided by faith-based organizations and other NGOs
- Retail outlets (only), including pharmacies, patent medicine shops, vendors
- Non-allopathic providers

The authors analyzed care-seeking data on acute respiratory illness, diarrhea, and fever for 42 countries.

We also included an ''other'' category for responses that did not fit in any of the above, and we created a new variable for ''any public provider,'' which included cases for which care was sought from one of the first 2 categories above. Note that with the exception of retail outlets, the categories used were *not* mutually exclusive so if, for the same case, advice or treatment was sought from providers from more than 1 category, that case would contribute to both values. Retail outlets were treated differently because we wanted to focus on episodes for which advice or treatment was sought from such outlets alone and so did not include those in

which the shop simply filled a prescription based on advice received from another category of provider.

Because the survey question is administered in a way that can elicit more than 1 source of care per episode, if, in fact, more than 1 was consulted, summing the proportions across all sources in most cases yields a slightly larger number than the total proportion of cases for which care was sought.

Although the interviewers were instructed to probe and include multiple sources, it is likely that there was some variation from one interviewer to another, as well as from one survey to another, in the extent to which multiple sources were identified.

Note that all n's and percentages in the tables are weighted. DHS and MICS surveys use a stratified cluster design, typically with strata consisting of all combinations of region (the first subnational unit) and place of residence (urban/rural). The weighting procedures are built into the software package used. Programming was done primarily with version 12 of Stata.

Supplementing the analysis disaggregating by type of provider, we have further explored aspects of care rendered by different categories of provider for insights into quality or appropriateness. For ARI, in DHS surveys that asked both about source of care and whether antibiotics were dispensed, we determined the proportion of cases receiving antibiotics, disaggregating by ''appropriate'' or ''medically trained'' providers (government health facilities, NGO health facilities, private physicians or health facilities, community health workers) vs. ''non-appropriate'' providers (drugs shops or pharmacies only and non-allopathic providers). In DHS, the ARI category is used as a reasonable proxy for possible pneumonia, potentially warranting antibiotic treatment. As such, the proportion of such cases for which antibiotics are given is a commonly used population indicator for adequacy of reach of pneumonia treatment services. Certainly, some proportion of such cases would not have had symptoms or signs at the time of examination that should prompt a competent clinician to prescribe antibiotics; however, very low rates of antibiotic treatment among cases seen by a health worker would suggest a systemic problem with adequacy of care.

For diarrhea care, we looked at 2 measures of quality. First, we determined the proportion receiving ORS, disaggregating by ''appropriate'' vs. ''non-appropriate'' provider. Second, restricting to cases of reported non-bloody diarrhea, we determined the proportion reporting using pills or syrups (excluding zinc). In most settings, these would include antibiotics and anti-motility agents, although, of course, this category could include many other remedies. We did not include cases of bloody diarrhea, for which antibiotic treatment would be warranted (and a response indicating use of pills or syrups could represent appropriate care). For the retained non-bloody diarrhea cases, current treatment recommended by the World Health Organization (WHO) includes only zinc and ORS. Therefore, we interpret the dispensing of other products for non-bloody diarrhea as representing a sub-optimal practice.

RESULTS

Overview

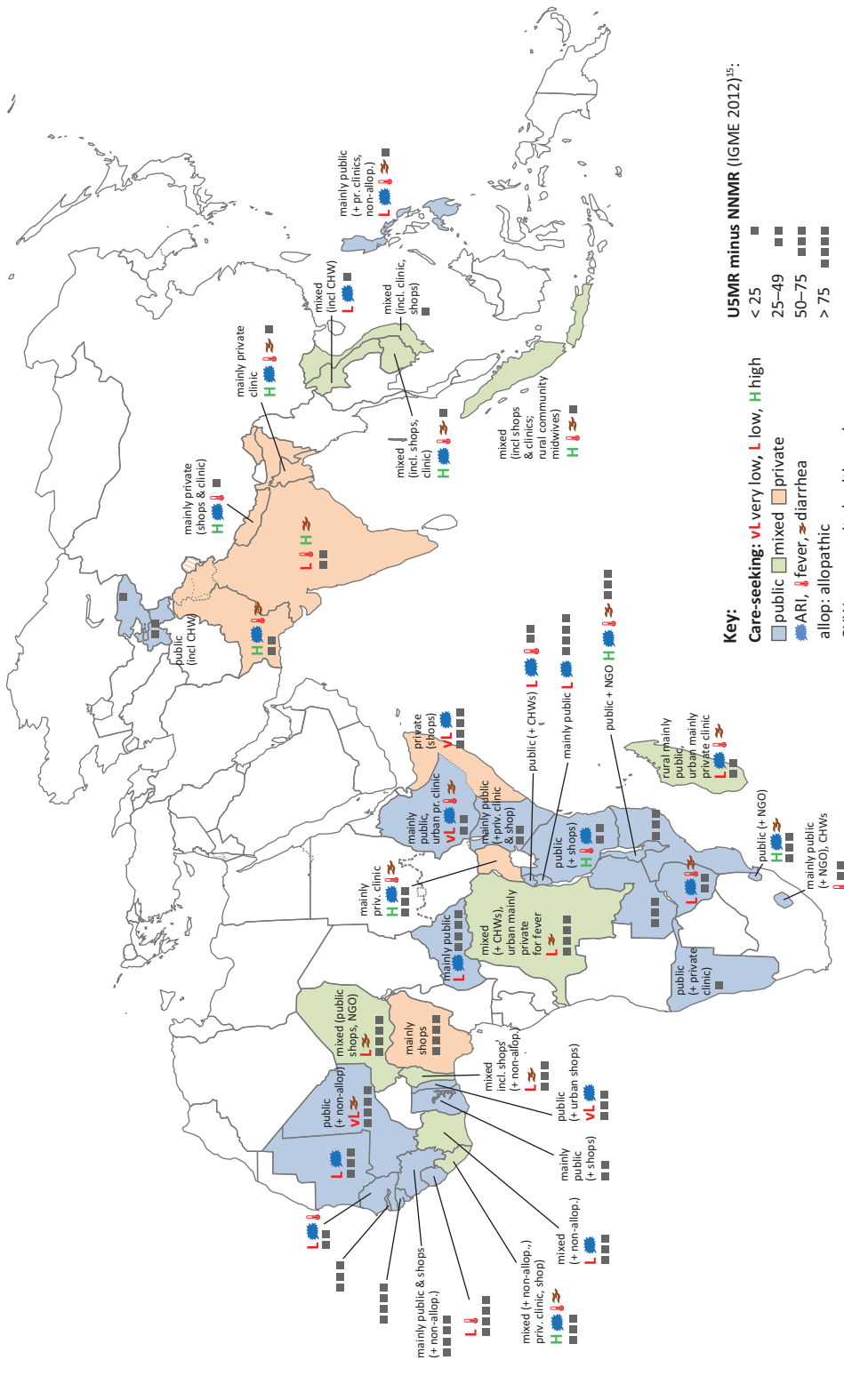
Detailed results for source of care for ARI, fever, and diarrhea are presented in Table 1, Table 2, and Table 3, and for quality of ARI and diarrhea care in Table 4 and Table 5. The map (see Figure) provides a clearer spatial picture of similarities and differences across countries and regions. As is evident from the map, a pattern of reliance primarily on public-sector sources is predominant across Africa, with several notable exceptions (Nigeria, Somalia, and Uganda). In South Asia, by contrast, the private sector is the major source. In Southeast Asia there is a more mixed pattern for sources of care. In general, care-seeking levels were high in the Asian countries (with the exception of the Philippines and the 2 Central Asian Republics included in the analysis), and mortality was lower than in the African countries.

Acute Respiratory Infection

Care-Seeking Levels

For ARI, in 31 of the 42 countries for which data are presented here, care is sought from any source for at least 60% of reported cases. In 8 countries (Burundi, Central African Republic, Lao People's Democratic Republic, Madagascar, Mali, Mauritania, Sierra Leone, Zimbabwe), care seeking is somewhat lower, in the range of 40%–59%. Care seeking is much lower in 3 countries (Ethiopia, Somalia, and Togo), at around 30%. In most of the countries considered here, a relatively small proportion of care is sought from categories of source assumed to not be medically qualified (shops and non-allopathic providers). But in 9 of these countries, more than 30% of care is sought from such sources. Six of these countries

FIGURE. Sources of Care Seeking for Childhood Illness



1. 42 countries are included in the map.
2. For purposes of characterizing the pattern of care seeking, public hospital, public outpatient health facility, and community health worker (CHW) are grouped to form "public." Similarly, "private clinic" (which includes private hospital, private clinic, and private clinician) is grouped with retail sources, referred to here as "shop," to form the category "private."
3. Comparing the proportion seeking care between two categories, if the difference is greater than 40 percentage points, the care-seeking pattern is characterized as simply "public" or "private" (more specifically "private clinic" or "shop" if that specific source is predominant).
4. If the difference is from 10–40 percentage points, the adjective "mainly" is used.
5. If the difference is less than 10, the term "mixed" is used.
6. Additional sources of care are mentioned if a percent threshold is met, notably: at least 5% for nonallopathic, CHW, or NGO; and at least 10% for "shop" or "private clinic."
7. For the following countries, MICS data were used and covered only acute respiratory infection (ARI), not diarrhea or fever: Burundi, Central African Republic, Côte d'Ivoire, Guinea-Bissau, Kyrgyzstan, Laos, Mauritania, Mozambique, Somalia, Tajikistan, Togo, and Vietnam.

are in western and west-central Africa (Benin, Côte d'Ivoire, the Democratic Republic of Congo, Mali, Niger, and Nigeria; the others were Bangladesh, Nepal, and Somalia).

Asia

The specific categories of provider from which care is obtained vary considerably by country, but certain patterns are evident. This is best appreciated by referring to the map (see Figure). In the Asian countries included here, care is obtained predominantly from the private sector, except in the 2 Central Asian Republics and Vietnam (where the public sector is the primary source); and in the Philippines, which has a mixed, public-private picture. In most of those countries where the private sector predominates, private clinicians are reported as the main source, although in Indonesia, drug shops were equally important, and in Nepal they were the most widely used source. The one Asian country included here in which community health workers (CHWs) are a significant source of care (for purposes of this paper, "significant" is used for cases in which 10% or more of cases sought care from a particular source) was Indonesia, where care was sought from village "health cadres" for 12% of cases.

The public sector plays a more important role as a provider of ARI care in Africa than in Asia.

Africa

In general, the public sector plays a more important role as a provider of ARI care in Africa than in Asia. But this is by no means the case in all countries. In 6 of the 16 western and west-central African countries included, more cases were treated outside than inside the public sector, with the private sector accounting for a particularly high proportion in the Democratic Republic of Congo, Niger, and Nigeria (the other countries in this region with predominantly private provision were Benin, Côte d'Ivoire, and Guinea). Among these countries, private-sector care consists mainly of care from shops, with the exception being the Democratic Republic of Congo, where private clinicians are also an important source. In several countries in this region, non-allopathic providers are an important source (Benin, Côte d'Ivoire, Guinea, and Mali). In several other countries where the public sector accounts for the largest proportion, private providers are also an important source, notably in Ghana and Liberia. In no countries in this region were CHWs a significant source of care (at least at the time of the most recent surveys), including Senegal, which was one of the first countries in Africa to scale up "community case management" (CCM). In southern and eastern Africa, in general, the public sector is the most important source for ARI care, but the picture varies across countries. In Kenya and Tanzania, although the public sector is the major source, drug shops are also important. Similarly, while the public sector is the major source in Madagascar and Namibia, private clinicians are also an important source. Uganda and Somalia are the 2 countries in this region considered in this analysis where the private sector is the main source of ARI care, with private clinicians providing care in Uganda, and shops filling that role in Somalia. Rwanda is the one country in this region where CHWs were a significant source of care at the time of the most recent survey (they were not in Madagascar or Malawi, where CCM has recently been widely implemented).

"Appropriate" vs. "Non-Appropriate" Care

For a small number of the surveys, we also had access to information on receipt of antibiotics, which is presented here disaggregated by "appropriate" vs. "non-appropriate" categories of provider (Table 4). Among those seeking care for ARI from medically qualified health workers, the proportion reporting receiving antibiotics varied considerably, with only 21% of such cases receiving antibiotics in Swaziland vs. 83% in Bangladesh. Among this small set of countries, only in Bangladesh and Nepal did "non-appropriate" providers constitute a significant source of care for ARI. Somewhat surprisingly, in Nepal, cases seen by such providers were far more likely to be treated with antibiotics than those seen by "appropriate" providers. In this instance, "non-appropriate" providers consisted primarily of drug shops and, as other investigators have documented,[5] most cases treated in this subsector were in fact assessed at the "shop" by some category of health worker.

Urban-Rural Disparities

For care seeking for ARI, in most countries there were moderate urban-rural disparities (5%–10% lower level of care seeking from any source, in rural areas); however, in 5 of the countries included here, the disparity was greater than 20% (Ethiopia, Guinea-Bissau, Lao, Rwanda, and Somalia), and in 8 countries care seeking was approximately equally common in rural and urban areas (the Gambia, Ghana, Indonesia, Mozambique, the Philippines, Tajikistan, Togo,

and Zambia). In most countries, private sources were more important in urban than in rural areas.

Fever

Care-Seeking Levels

As a symptom of childhood illness, fever is of particular public health significance in countries with more heavily endemic malaria. Among the countries for which data were analyzed for this paper, care seeking for fever, from any source, was at similar levels as for ARI (Table 2). In 20 of the 29 countries, 60% or more of cases sought care. In 8 countries (India, Madagascar, Mali, the Philippines, Rwanda, Senegal, Sierra Leone, and Zimbabwe), 40%–59% sought care. In Ethiopia, a much lower proportion (26%) sought care—although malaria is not a major public health problem in most of Ethiopia. The relatively low level of care seeking is of particular concern in those countries where malaria makes up a significant proportion of childhood deaths, notably Mali, Senegal, and Sierra Leone. As with ARI, in most countries non-medically qualified providers accounted for a small proportion of care. In 3 countries, however, they made up 30%–50% (Benin, Guinea, and Nigeria), and in Bangladesh (where malaria is not a significant public health problem) such providers accounted for over 60% of care. Categories of provider consulted were similar to those seen for ARI.

Asia

Among the Asian countries included, only in the Philippines was the public sector the principal source of care. Private clinicians were the main source of care in India and Pakistan. Bangladesh, Cambodia, and Nepal showed mixed pictures, with shops and private clinicians contributing. Non-allopathic providers were an important source in Bangladesh. Only in Indonesia were CHWs (''village health cadres'') a significant source.

Africa

In 6 of the 10 *western and west-central African countries*, the private sector was the main source of care for fever. In Liberia, clinicians were the main private source; in the Democratic Republic of Congo, shops and private clinicians were equally important. In the others (Benin, Guinea, Niger, and Nigeria), private shops/vendors predominated. Non-allopathic providers were a significant source in Benin, Guinea, and Mali. In the remaining countries in this region, the public sector was the main source, with contributions from the private sector. NGO/religious sources were an important contributor in Niger. CHWs were not a significant source in any of these countries.

Low levels of care seeking for fever is of particular concern in countries where malaria makes up a significant proportion of childhood deaths.

In *southern and eastern* Africa, the picture was similar to that for ARI. The public sector accounted for the largest proportion of cases seen except in Uganda, where private clinicians predominated. Drug shops were an important source in Kenya and Tanzania, as were CHWs in Rwanda. Religious/NGO institutions were a significant source in Lesotho and Swaziland.

Urban-Rural Disparities

Urban-rural disparities for fever differed from those seen with ARI; many countries (12) had essentially equally high care-seeking rates in urban and rural areas. Only 1 (Sierra Leone) had a gap of more than 20 percentage points. As with ARI, the private sector was generally a more important source in urban settings than in rural ones.

Diarrhea

Care-Seeking Levels

Although in most countries care for diarrhea (Table 3) was sought outside the home for most cases, such care seeking was less frequent than for ARI or fever. In 10 of 29 countries considered here, less than half of cases received care outside the home. This included several western and west-central African countries that were also noted to have lower levels of care seeking for ARI or fever, notably the Democratic Republic of Congo, Guinea, Mali, Niger, Nigeria, and Senegal. Other countries where less than half received such care were Ethiopia, Madagascar, the Philippines, and Zimbabwe. Non-medically qualified providers accounted for 30%–50% of cases in many of the western African countries (Benin, Ghana, Guinea, Liberia, Mali, Niger, and Nigeria) as well as in Bangladesh and Nepal.

Bangladesh had the highest proportion of cases treated with ORS. However, the other countries with high ORS use (Kenya, Malawi, Namibia, and Sierra Leone) relied relatively little on non-medically trained providers. Community health workers were a significant source of diarrhea care in the Democratic Republic of

Congo and Rwanda. ORS use was especially low (<25%) in Madagascar, Mali, Senegal, and Zimbabwe where most diarrhea treatment is done in the public sector; in Niger, with mixed provision; and in Benin, where most such care is in the private sector.

''Appropriate'' vs. ''Non-Appropriate'' Care

Two dimensions of appropriateness or quality of diarrhea care were investigated (Table 5):

- The dispensing of pills and syrups other than zinc for non-bloody diarrhea (most often antibiotics or anti-motility drugs), which is not in compliance with WHO guidelines
- The use of ORS for all diarrhea cases as a positive indicator of quality

In 18 of 22 countries, most episodes of non-bloody diarrhea cared for by ''appropriate,'' presumably medically qualified, providers received pills or syrups. Liberia and Namibia performed relatively better; only about one-third of such cases were given such non-recommended treatment.

On a more positive note, in the same number of countries (18 of 22) most ''appropriate'' providers dispensed ORS. A very high proportion dispensed ORS in Kenya, Namibia, Sierra Leone, and Zambia. In India, however, of cases seen by ''appropriate'' providers, only 36% received ORS (in Madagascar, Senegal, and Zimbabwe; also, most cases seen by ''appropriate'' providers did *not* receive ORS).

Among ''non-appropriate'' sources, rates of provision of pills and syrups were similar to those for medically qualified providers. However, ''non-appropriate'' providers generally offered ORS much less frequently than did the medically qualified ones. In several countries, notably in Kenya, the Philippines, and Uganda, reported ORS-use rates were higher than care-seeking rates, possibly reflecting household management with ORS supplies regularly kept on hand.

Urban-Rural Disparities

Urban-rural disparities in care seeking were smaller for diarrhea than for the other 2 conditions, with 14 countries having essentially equal rates, and 2 (Malawi and Zimbabwe) having higher care seeking in rural than urban areas. Only Ethiopia had an urban-rural gap of greater than 20 percentage points. As with the other conditions, the usual pattern was greater use of private sources in urban than in rural areas.

DISCUSSION AND CONCLUSIONS

Why This Analysis

Other investigators have done similar analyses in the past, looking at care seeking in individual countries[2–5] and based on multi-country analysis of DHS data.[6] In unpublished work, Montagu and Visconi[7] have recently done such analysis looking specifically at care seeking from the public sector vs. private sector (further subdivided as formal vs. informal), disaggregating by wealth quintile. Their analysis, while useful in exploring policy-relevant equity issues, provides less immediately useful information for program managers interested in developing a contextually strategic approach to improving care among the populations they are serving.

There are limitations to the analysis presented in this paper. As is evident in the tables, for some of the surveys the samples are quite small; therefore, the point estimates lack statistical precision (this has been flagged by giving estimates based on a cell size of less than 25 in parentheses). The oldest of the surveys included date to 2005 and 2006, so for some countries the data presented here may not adequately represent the current situation. It is likely that in some surveys there is substantial misclassification. For example, the provider in a peripheral dispensary or health hut may be a cadre of community health worker or health auxiliary but cannot be identified as such through the currently available data. Likewise, in some settings[5] the shops that caregivers report getting treatment from are, in effect, outpatient clinics where children are typically examined and the treatment decision is made by the health worker at the ''shop,'' not by the household caregiver. Nevertheless, these disaggregated survey findings provide additional useful information to the program developer, over and above what is routinely presented in DHS and MICS survey reports. The 5 country boxes give examples of how these data can help guide program strategy and prioritization.

Why Care-Seeking Patterns Are Important

Current patterns of care seeking need to be an important consideration in the development of effective approaches to improve case management for childhood illness at population scale. For

example, in a given setting, if seeking care from any source is particularly uncommon in rural areas, strategies should be developed to address the actual barriers to such care seeking—for example, task shifting case management to auxiliary health workers to bring services closer to the population. If there is a high rate of care seeking from private practitioners, it may be appropriate to investigate quality of care, as has been done in some studies,[8] and, if serious problems are found, to develop strategies targeting quality of care in the private sector. Likewise, if shops are a major source of care, social marketing or social-franchising approaches could be appropriate to help ensure appropriateness of care.

We are fortunate that DHS and MICS data sets already include useful information on this issue. Every time this information has been needed at country level, however, it has required further secondary analysis. In this paper, we have addressed this gap, making such information available for program managers across this set of 42 countries (indeed, this is the main objective of this study). We believe that similar disaggregated analysis should be routinely included in subsequent DHS and MICS reports.

Need to Know More About Actual Care Provided

Although this analysis provides useful additional understanding of care-seeking patterns, clearly more is required to inform the development of strategies that are optimally responsive to the local context. Beyond knowing where caregivers are seeking treatment or advice, we need more information on the actual care provided. This paper has made available further analysis using DHS data from a limited number of countries, giving some indication about the quality of care provided, disaggregating by sources of care considered ''appropriate'' or ''non-appropriate.'' In certain settings, patients may be obtaining suitable care from ''non-appropriate'' or informal providers—for example, receiving ORS for diarrhea. Programmatic use of such a distribution channel may well be appropriate in some settings. However, this analysis has also demonstrated that even ''appropriate'' providers may be giving substandard treatment. For example, in almost all of the surveys it was found that most such providers dispense pills and syrups of various kinds (other than zinc) for non-bloody diarrhea. Whereas, in Bangladesh, fully 77% of those going to ''non-appropriate'' providers (shops and non-allopathic practitioners) received ORS, in India, only 36% of cases seen by ''appropriate'' or medically qualified providers received ORS. In Swaziland, relatively few cases of ARI seen by ''appropriate'' providers received antibiotics. This kind of country-specific information is needed by those tasked with determining the most effective strategies for improving sick-child care in their settings.

The Role of Community Health Workers

Current global health program efforts in sick-child care focus mostly on ''community case management,'' that is, care provided by community health workers or health auxiliaries. In the analysis presented in this paper, care given by such providers represents a very small part of the service delivery mix. The Democratic Republic of Congo and Rwanda were the only countries of those analyzed where over 10% of cases of diarrhea were treated by CHWs. Only in Indonesia and Rwanda did CHWs treat more than 10% of ARI cases. In Nepal, where use of CHWs for such case management was pioneered and first taken to national scale, only 2%–3% of ARI and diarrhea cases are seen by CHWs, and most care is provided in the private sector. In Senegal, where CCM had expanded to cover almost all districts in the country by the time of the most recent DHS, CHWs were seen for only 1%–2% of cases of the 3 conditions. In Malawi, there has recently been significant CCM program expansion, but the last DHS predated this, so it does not reflect whatever relative contribution this program may currently be making. Nevertheless, the analysis presented here suggests that in most settings it may be inappropriate to focus program efforts on CHWs to the exclusion of other sources of care, which may, in fact, be much more widely used.

Disaggregated analysis of care-seeking behavior for child illness should be routinely included in DHS and MICS reports.

It may be inappropriate to focus program efforts on community health workers to the exclusion of more widely used sources of care.

Context Matters

As with most public health problems, context matters in care seeking for childhood illness. Strategies that fail to take context into account are likely to be less effective. The first step in developing a strategy that is responsive to the actual situation on the ground is to understand what that situation is. In this case, that means understanding where caregivers are going when their children fall ill and what care is actually provided.

TABLE 1. Sources of Care for Acute Respiratory Infection (%)

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Survey – DHS Africa												
West and Central Africa												
Benin 2006	Urban	(4)	19	11		(4)	19	12	10	22	73	**453**
	Rural	(2)	24	6	(1)	3	14	12	10	26	66	**926**
	All	3	22	7	(1)	3	16	12	10	25	69	**1,379**
DR Congo 2007	Urban	(8)	16	18	(4)		23	(2)	(1)	24	65	**226**
	Rural	(4)	24	5	10		12	6	(2)	26	56	**336**
	All	5	21	10	7		16	4	(2)	26	60	**562**
Ghana 2008	Urban	(36)	(3)	(15)			(10)		(3)	(38)	63	**53**
	Rural	(14)	32	(4)			(15)	(1)	(2)	45	66	**97**
	All	22	22	(8)			(13)	(1)	(2)	43	65	**150**
Guinea 2005	Urban	(13)	40	(7)			(6)	(2)	(6)	51	72	**95**
	Rural	(3)	28	(2)	(5)		17	14	(1)	31	65	**356**
	All	(5)	30	(3)	(4)		15	12	(2)	35	67	**451**
Liberia 2007	Urban	(15)	43	(16)			(10)		(1)	58	83	**104**
	Rural	(8)	34	18			15	(4)	(4)	42	78	**336**
	All	10	36	18			14	(3)	(3)	46	80	**440**
Mali 2006	Urban	(5)	39	(6)	(1)		(12)	(6)	(4)	43	69	**188**
	Rural	(1)	32	(1)			(2)	11	10	32	56	**518**
	All	(2)	33	(2)	(1)		5	10	8	35	59	**706**

TABLE 1 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Niger 2006	Urban	(5)	42	(7)		(10)	(16)	(3)	4	46	79	**173**
	Rural	(1)	24			21	25	4		25	72	**1,034**
	All	(2)	26	(1)		19	23	4	(1)	28	73	**1,207**
Nigeria 2008	Urban	18	(6)	(9)			42	(3)		24	77	**172**
	Rural	9	13	8	(2)		36	(2)		22	66	**519**
	All	11	12	9	(1)		37	(2)		22	69	**690**
Senegal 2010–2011	Urban	14	37	9	(2)		(8)	(1)		50	69	**310**
	Rural	(3)	32	(1)	(2)		(4)	(6)	(4)	35	50	**278**
	All	9	35	(5)	(2)		(6)	(3)	(2)	43	60	**589**
Sierra Leone 2008	Urban	(8)	(29)	(11)	(2)		(9)			(36)	58	**56**
	Rural	(6)	33	(7)	(2)		(4)	(1)	(1)	38	51	**281**
	All	(6)	32	(7)	(2)		(5)	(1)	(1)	38	52	**337**
Southern Africa												
Lesotho 2009	Urban	(24)	(9)	(27)		(22)		(10)		(32)	(71)	**22**
	Rural	(8)	32	(7)	(4)	16	(5)	(2)		39	72	**162**
	All	(10)	29	(9)	(4)	17	(5)	(3)		39	72	**184**
Madagascar 2008–2009	Urban	(8)	(18)	(35)					(1)	(25)	61	**52**
	Rural		30	10			(7)	(2)	(1)	30	47	**292**
	All	(1)	28	14			(6)	(2)	(1)	29	49	**345**
Malawi 2010	Urban	34	21	(11)		(3)				54	68	**168**
	Rural	14	42	8		11	6	(1)	(1)	55	78	**1,053**
	All	17	39	9		10	6	(1)	(1)	55	76	**1,221**

TABLE 1 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Namibia 2006–2007	Urban	(29)	(34)	(22)			(4)		(1)	63	87	**52**
	Rural	22	37	(9)				(1)		58	67	**149**
	All	24	36	13			(1)	(1)		59	72	**201**
Swaziland 2006–2007	Urban	12	31	(6)	(3)	34	(4)			42	82	**32**
	Rural	(3)	(50)	(5)	(1)	(14)	(6)			(53)	(77)	**182**
	All	(5)	47	(5)	(2)	17	(6)			52	78	**214**
Zambia 2007	Urban	(10)	57	(1)			(10)			66	72	**95**
	Rural	(5)	54	(1)	(1)	(8)	(5)	(3)	(1)	59	75	**209**
	All	(7)	55	(1)	(1)	(6)	(6)	(3)	(1)	61	74	**304**
Zimbabwe 2010–2011	Urban	(3)	34	(6)			16			38	60	**38**
	Rural	(1)	43			(5)	(4)		(2)	(44)	(54)	**179**
	All	(2)	42	(1)		(4)	(6)		(1)	43	55	**217**
East Africa												
Ethiopia 2011	Urban	(6)	(15)	(28)		(2)	(3)			(19)	50	**69**
	Rural		19	5			2			20	27	**703**
	All	(1)	19	7			2			20	29	**773**
Kenya 2008–2009	Urban	(20)	30	(12)		(10)	(14)			47	79	**71**
	Rural	12	33	9		(2)	14	(1)	(1)	44	69	**346**
	All	13	33	10		(3)	14	(1)	(1)	45	70	**416**

TABLE 1 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Rwanda 2010	Urban		(45)	(21)	(10)		(6)		(2)	(45)	84	**54**
	Rural		35		14		(3)	(1)	9	35	58	**269**
	All		36	(4)	13		(4)	(1)	8	36	62	**322**
Tanzania 2010	Urban	(25)	47				(10)		(14)	70	85	**85**
	Rural	(6)	51				18		(5)	57	78	**247**
	All	11	50				16		8	60	80	**332**
Uganda 2011	Urban	(13)	(16)	55	(3)		(7)		(3)	28	90	**141**
	Rural	4	29	48	(2)	(1)	3	(1)	(1)	32	82	**977**
	All	5	27	49	2	(1)	4	(1)	(1)	32	83	**1,118**
Survey – DHS Asia												
Bangladesh 2011	Urban	(5)	(7)	57	(1)	(1)	(21)	(3)	(1)	(12)	91	**40**
	Rural	(3)	(9)	45	(1)		22	(6)	(1)	12	80	**237**
	All	(4)	(8)	47	(1)	(1)	22	(5)	(1)	12	82	**277**
Cambodia 2010	Urban	(17)	(24)	(26)			(22)		(9)	(39)	89	**41**
	Rural	(5)	21	20			18		24	26	84	**457**
	All	6	21	21			18		23[b]	27	85	**498**
India 2005–2006	Urban	12	4	60	(1)		3	3	1	16	81	**1,110**
	Rural	6	10	46	1		4	4	2	15	70	**4,762**
	All	7	9	49	1		4	4	2	15	72	**5,872**

TABLE 1 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Indonesia 2007	Urban	(3)	22	29	5	(1)	23		19	25	94	**686**
	Rural	(2)	23	11	16	(2)	24	(2)	19	25	91	**1,103**
	All	3	22	18	12	(1)	24	2	19	25	92	**1,789**
Nepal 2011	Urban	(28)	(5)	(43)	(1)		(26)			(33)	(89)	**24**
	Rural	(2)	20	19	(3)		31	(2)	(3)	22	77	**215**
	All	(5)	19	23	(2)		30	(2)	(2)	23	78	**238**
Pakistan 2006–2007	Urban	8	(1)	71	(1)		(1)	(3)	(6)	9	89	**323**
	Rural	8	(2)	56			(3)	(2)	12	10	81	**854**
	All	8	2	60			(2)	3	10	10	83	**1,178**
Philippines 2008	Urban	(13)	28	(18)			(2)	(5)	(1)	39	61	**127**
	Rural	(5)	30	13			(4)	15	(1)	35	60	**197**
	All	8	29	15			(3)	11	(1)	36	60	**324**
Survey - MICS												
Burundi 2006	Urban	(17)	(14)	(15)	(2)		(6)	(1)	(2)	31	(52)	**25**
	Rural	6	28	4			(1)	(1)	3	33	43	**1,061**
	All	6	27	4			(1)	(1)	3	33	43	**1,086**
Central Afr Rep 2006	Urban	19	12	(7)			(4)	(1)	11	29	48	**283**
	Rural	(4)	17	(5)	(4)		(3)	(3)	(4)	20	36	**389**
	All	10	15	6	(2)		(3)	(2)	7[c]	24	41	**672**
Côte d'Ivoire 2006	Urban	24	(19)	(13)	(2)		(5)	(12)	(7)	43	71	**121**
	Rural	(6)	16	(2)	(3)		(6)	13	17	22	57	**301**
	All	11	17	(5)	(3)		6	13	14[c]	28	61	**422**

TABLE 1 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Gambia 2006	Urban	(12)	43	(11)			(19)		(2)	54	79	**127**
	Rural	(8)	56	(7)	(4)		(7)	(2)	(2)	64	79	**236**
	All	10	51	8	(2)		11	(1)	(2)	60	79	**362**
Guinea Bissau 2006	Urban	45	26	(11)	(3)		(1)	(1)	(9)	63	76	**101**
	Rural	17	27	(2)	(5)		(1)	(1)	(8)	41	53	**148**
	All	28	27	(5)	(4)		(1)	(1)	(8)	49	62	**249**
Kyrgyzstan 2006	Urban	42	(27)		(1)		(6)			69	70	**73**
	Rural	(17)	48	(8)	(1)		(1)			57	58	**99**
	All	28	39	(4)	(1)		(3)			62	63	**172**
Laos 2006	Urban	(32)	(8)	(18)			(15)			(40)	(73)	**18**
	Rural	(9)	(13)	(11)	(9)		(6)		(3)	20	47	**172**
	All	(11)	(13)	(12)	(9)		(7)		(3)	22	50	**190**
Mauritania 2007	Urban	16	23	(8)	0		(9)			38	53	**264**
	Rural	9	22	(3)	(3)		(2)			31	36	**288**
	All	12	22	5	(2)		5			34	45	**552**
Mozambique 2008	Urban	(9)	59	(6)			(2)		(5)	66	77	**178**
	Rural		63	(4)	(1)				(5)	63	73	**356**
	All	(3)	62	(4)			(1)		5	64	74	**534**
Somalia 2006	Urban	(4)	10	11			28	(1)		13	51	**280**
	Rural	(1)	(2)	(4)	(2)		14	(1)	(1)	(3)	22	**558**
	All	(2)	4	6	(1)		18	(1)	(1)	6	32	**838**

TABLE 1 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Tajikistan 2005	Urban	(30)	(28)							(58)	(58)	**21**
	Rural	(23)	(41)		(13)					(57)	67	**43**
	All	(25)	(37)		(9)					57	64	**64**
Togo 2006	Urban	(5)	(12)	(6)			(1)	(1)	(7)	(18)	30	**34**
	Rural	(2)	15	(2)	(2)		(1)	(7)	(2)	17	30	**236**
	All	(3)	14	(3)	(1)		(1)	(5)	(4)	17	30	**270**
Vietnam 2006	Urban	36	(13)	45	(6)		(15)			49	99	**101**
	Rural	18	35	26	(6)		8	(1)	(3)	50	89	**366**
	All	21	31	29	6		9	(1)	(2)	50	90	**467**

[a] N values are adjusted (see Methods section). Note that point estimates for proportions based on adjusted Ns of less than 25 are indicated in parentheses, indicating a lower level of precision.

[b] This consisted mostly of "home of trained health worker."

[c] In most of these cases, the reported source was "parent or friend."

Abbreviations: CHW, community health worker; HF, health facility; NGO, nongovernmental organization.

TABLE 2. Sources of Care for Fever (%)

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Survey – DHS Africa												
West and Central Africa												
Benin 2006	Urban	(6)	20	12		4	17	9	10	25	73	**1,307**
	Rural	2	24	6	(1)	3	12	10	9	26	63	**2,854**
	All	3	23	8	(1)	3	14	10	10	26	66	**4,162**
DR Congo 2007	Urban	6	14	21	(4)		18	(1)	(4)	19	63	**950**
	Rural	(3)	21	6	10		10	4	(2)	24	54	**1,519**
	All	4	18	12	8		13	3	3	22	57	**2,469**
Ghana 2008	Urban	34	(8)	18			23			42	82	**197**
	Rural	16	25	(4)			15		(4)	41	64	**347**
	All	23	19	9			18		(3)	41	70	**544**
Guinea 2005	Urban	14	32	(7)	(2)		17	(4)	(4)	43	73	**376**
	Rural	(1)	24	(2)	(4)		19	11	(1)	26	59	**1,526**
	All	4	26	3	4		18	10	(2)	29	62	**1,902**
Liberia 2007	Urban	17	30	23			17	(2)	(2)	46	81	**450**
	Rural	6	26	21			15	9	7	32	74	**1,127**
	All	9	27	22			15	7	6	36	76	**1,577**
Mali 2006	Urban	(4)	37	(4)	(1)		12	12	(4)	41	72	**558**
	Rural		25		2		4	12	11	26	53	**1,680**
	All	2	28	(1)	2		6	12	9	29	57	**2,238**

TABLE 2 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Niger 2006	Urban	(6)	43	(7)		(9)	13	(1)	(3)	49	78	**324**
	Rural		25			18	18	3		25	62	**2,019**
	All	(1)	27	(1)		16	17	2	(1)	28	64	**2,343**
Nigeria 2008	Urban	19	10	12	(1)		33		(1)	28	74	**987**
	Rural	9	16	8	(1)		34	(1)	(1)	25	68	**2,981**
	All	12	14	9	1		34	1	1	26	70	**3,968**
Senegal 2010–2011	Urban	12	30	7	(2)		9	(1)	4	42	62	**1,211**
	Rural	3	31	(1)	2		5	3	2	34	46	**1,252**
	All	8	31	4	2		7	2	3	38	54	**2,463**
Sierra Leone 2008	Urban	(11)	17	18	(3)		(16)		(5)	28	69	**352**
	Rural	(4)	30	8	(2)		6	(1)		33	49	**931**
	All	6	26	11	(2)		9	(1)	(2)	32	55	**1,283**
Southern Africa												
Lesotho 2009	Urban	31	(11)	(8)		(7)	(5)	(2)		43	60	**112**
	Rural	(6)	26	9	(6)	16	(4)	(2)	(1)	32	68	**465**
	All	11	23	9	(5)	14	(4)	(2)		34	66	**577**
Madagascar 2008–2009	Urban	(5)	18	39			(2)			24	63	**164**
	Rural	(1)	29	8			5	(2)	(1)	30	45	**952**
	All	(2)	27	13			4	(1)	(1)	29	47	**1,116**
Malawi 2010	Urban	30	24	13		(5)	(3)		(1)	53	72	**786**
	Rural	11	40	5		10	8	(1)	(1)	50	73	**5,428**
	All	13	38	6		9	8		(1)	51	73	**6,214**

TABLE 2 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Namibia 2006–2007	Urban	15	25	17			(5)	(1)		40	63	**320**
	Rural	15	36	(5)			(2)	(1)		50	57	**476**
	All	15	32	10			(3)	(1)		46	60	**795**
Swaziland 2006–2007	Urban	(7)	(30)	(9)	(2)	(12)	(6)			36	61	**98**
	Rural	(3)	42	(4)	(1)	10	(5)		(1)	45	63	**605**
	All	(4)	40	(4)	(1)	10	(5)		(1)	44	63	**703**
Zambia 2007	Urban	9	54	(2)			(7)			63	71	**276**
	Rural	(3)	50		(2)	*7*	*7*	(2)	(2)	53	71	**768**
	All	*5*	51	(1)	(2)	*5*	*7*	(1)	(1)	55	71	**1,044**
Zimbabwe 2010–2011	Urban	(1)	25	(3)		(1)	12		(3)	25	44	**134**
	Rural	(1)	33	(1)		(4)	(4)		(1)	34	44	**372**
	All	(1)	31	(2)		(3)	6		(1)	32	44	**506**
East Africa												
Ethiopia 2011	Urban	(4)	19	16		(1)	(4)			22	41	**226**
	Rural	(1)	16	6		(1)	2	(1)		16	24	**1,659**
	All	(1)	16	*7*		(1)	2			17	26	**1,885**
Kenya 2008–2009	Urban	24	18	(9)		(4)	11			41	63	**223**
	Rural	10	29	8		(2)	14			39	62	**1,079**
	All	12	27	8		(2)	14			39	62	**1,302**
Rwanda 2010	Urban	(1)	29	(13)	(14)		(8)		(1)	31	65	**172**
	Rural		26		16		3	(1)	4	26	49	**1,183**
	All		26	2	16		3	(1)	4	27	51	**1,355**

TABLE 2 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Tanzania 2010	Urban	19	32	(2)			15		16	50	80	**454**
	Rural	(2)	52				23		4	53	78	**1,300**
	All	7	47				21		7	53	79	**1,754**
Uganda 2011	Urban	21	(11)	45	(3)		(4)			32	85	**330**
	Rural	5	24	45	5		4		(1)	28	83	**2,712**
	All	6	23	45	5		4		(1)	28	83	**3,042**
Survey – DHS Asia												
Bangladesh 2011	Urban	(3)	(8)	45		(1)	20	(3)	(1)	(11)	76	**70**
	Rural	(2)	(7)	43			21	(5)	(1)	8	74	**318**
	All	(2)	7	43			21	(4)	(1)	9	75	**388**
Cambodia 2010	Urban	(13)	(13)	26			30		(11)	25	86	**318**
	Rural	5	27	17			19		21	31	82	**1,877**
	All	6	25	18			20		19[b]	30	82	**2,194**
India 2005–2006	Urban	9	2	46			2	2		11	60	**1,954**
	Rural	4	7	36	(1)		4	2	2	11	52	**6,931**
	All	5	6	38	(1)		3	2	2	11	54	**8,885**
Indonesia 2007	Urban	(3)	25	25	6	(1)	21		19	27	93	**1,937**
	Rural	2	24	11	15	(1)	23	2	19	25	90	**3,096**
	All	2	24	16	12	(1)	23	2	19[c]	26	91	**5,033**
Nepal 2011	Urban	(13)	(6)	(36)	(1)	(1)	(27)		(1)	(19)	81	**91**
	Rural	(2)	15	22	(2)		30		(1)	17	71	**869**
	All	(3)	14	23	(2)		30		(1)	17	72	**960**

TABLE 2 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Pakistan 2006–2007	Urban	8	(1)	67	(1)		(2)	(4)	(4)	8	83	**791**
	Rural	9	(2)	51			(4)	(2)	14	11	80	**1,777**
	All	8	(2)	56			3	3	11	10	81	**2,569**
Philippines 2008	Urban	(6)	24	18			(2)	(6)		30	53	**586**
	Rural	(3)	22	10			(4)	10		25	46	**799**
	All	5	23	13			(3)	8		27	49	**1,385**

[a] N values are adjusted (see Methods section). Note that point estimates for proportions based on adjusted Ns of less than 25 are indicated in parentheses, indicating a lower level of precision.

[b] This consisted mostly of home of trained health worker.

[c] This consisted mostly of community nurse-midwives.

Abbreviations: CHW, community health worker; HF, health facility; NGO, nongovernmental organization.

TABLE 3. Sources of Care for Diarrhea (%)

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Survey – DHS Africa												
West and Central Africa												
Benin 2006	Urban	2	12	6		2	12	7		15	39	**393**
	Rural	1	15	2		2	11	10		16	41	**925**
	All	2	14	3		2	11	9		16	40	**1,317**
DR Congo 2007	Urban	(2)	22	(1)	8		4		(2)	24	34	**239**
	Rural	(1)	22		14		5		2	22	38	**360**
	All	(1)	22		12		4		2	23	37	**599**
Ghana 2008	Urban	22	(8)	(8)			28		(4)	29	66	**181**
	Rural	17	22	(4)			19		(2)	39	62	**361**
	All	18	17	5			22		(2)	36	63	**542**
Guinea 2005	Urban	8	31	(6)	(1)		8	7	(2)	38	55	**200**
	Rural	(1)	17		4		12	9	2	18	44	**697**
	All	3	20	(1)	3		11	9	2	23	47	**897**
Liberia 2007	Urban	11	29	15			24	(3)	(5)	39	77	**293**
	Rural	4	22	23			18	16	10	26	79	**721**
	All	6	24	20			20	12	9	30	78	**1,014**
Mali 2006	Urban	(3)	25	5			(2)	8	(2)	28	42	**325**
	Rural		14	(1)			3	8	4	14	28	**1,334**
	All	(1)	16	2			3	8	3	16	31	**1,660**

TABLE 3 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Niger 2006	Urban	(4)	22	(7)			(8)	(3)	(2)	26	43	**242**
	Rural		14	(1)			12	3	2	14	32	**1,576**
	All	(1)	15	2			11	3	2	16	33	**1,818**
Nigeria 2008	Urban	17	11	12	(1)		28		(1)	28	70	**608**
	Rural	8	13	6	2		31	2	2	22	63	**1,922**
	All	10	13	7	2		30	2	2	23	64	**2,530**
Senegal 2010–2011	Urban	10	21	4	(1)		7	3	5	31	48	**978**
	Rural	3	30	(1)	(1)		4	5	5	32	47	**1,268**
	All	6	26	2	(1)		5	4	5	32	48	**2,246**
Sierra Leone 2008	Urban	(5)	24	16	(3)		10	(1)	(2)	29	61	**153**
	Rural	5	35	5	3		4	4	(2)	40	54	**523**
	All	5	32	8	3		5	3	2	37	55	**676**
Southern Africa												
Lesotho 2009	Urban	24	(6)	(20)	(3)	(4)			(6)	29	59	**78**
	Rural	6	25	7	6	12	(1)	(4)	(2)	31	59	**297**
	All	10	21	9	5	10	(1)	(3)	(3)	31	59	**375**
Madagascar 2008–2009	Urban	(2)	26	24			(4)		(5)	28	57	**151**
	Rural		25	6			(2)	(2)	(2)	26	38	**841**
	All		25	9			(2)	(2)	3	26	41	**993**
Malawi 2010	Urban	25	25	(3)		4	5	(1)	(3)	50	63	**467**
	Rural	9	43	5		9	7	2	2	52	73	**2,691**
	All	12	40	4		8	7	2	2	51	71	**3,158**

TABLE 3 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Namibia 2006–2007	Urban	22	39	8			(3)	(1)		57	67	**243**
	Rural	17	39	(3)			(1)	(4)	(1)	54	63	**334**
	All	19	39	5			(2)	(3)	(1)	55	65	**577**
Swaziland 2006–2007	Urban	(11)	(24)	(11)	(2)	(22)	(9)	(2)		35	73	**52**
	Rural	(4)	50	5	(1)	16	(2)	(2)	(1)	53	76	**292**
	All	5	46	6	(1)	17	(3)	(2)	(1)	50	75	**343**
Zambia 2007	Urban	(7)	47	(3)			(3)			54	60	**291**
	Rural	(2)	51	(1)	(2)	5	3	7	(2)	52	68	**619**
	All	3	50	2	2	4	3	5	2	53	65	**911**
Zimbabwe 2010–2011	Urban	(1)	35	(2)	(1)		(3)			35	40	**230**
	Rural	(1)	29		(1)	(4)	(1)	(2)	(2)	30	39	**458**
	All	(1)	31	(1)	(1)	(3)	(1)	(1)	(2)	32	40	**688**
East Africa												
Ethiopia 2011	Urban	(2)	34	23		(1)	(5)			35	58	**158**
	Rural		22	6		(1)	2	1		23	33	**1,326**
	All		24	8		(1)	3	1		24	36	**1,483**
Kenya 2008–2009	Urban	18	15	13		(3)	12			32	59	**169**
	Rural	8	33	7	(1)	(2)	8	5	(1)	40	60	**740**
	All	10	29	8	(1)	2	9	4	(1)	39	60	**909**
Rwanda 2010	Urban	(1)	24	(5)	(6)		(8)	(4)	(3)	25	48	**140**
	Rural		24	(1)	14		4	3	8	24	50	**992**
	All		24	2	13		4	3	7	24	50	**1,132**

TABLE 3 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Tanzania 2010	Urban	10	30	(2)			14		11	39	63	**276**
	Rural	2	44				16		4	46	64	**833**
	All	4	41				15		6	44	64	**1,109**
Uganda 2011	Urban	(11)	(14)	47	(2)		(4)			25	74	**237**
	Rural	4	28	41	(1)		3	(1)	(1)	32	77	**1,528**
	All	5	26	42	(1)		3	(1)	(1)	31	77	**1,766**
Survey – DHS Asia												
Bangladesh 2011	Urban	(7)	(8)	45		(1)	(15)	(1)		(15)	75	**70**
	Rural	(2)	8	40			24	(4)		10	76	**318**
	All	(3)	8	41		(1)	22	(3)		11	76	**388**
Cambodia 2010	Urban	13	14	45		1	22		10	27	78	**131**
	Rural	5	24	40			16		20	28	74	**1,029**
	All	6	22	41			16		19[b]	28	75	**1,161**
India 2005–2006	Urban	13	4	61			3	2	(1)	16	80	**1,338**
	Rural	6	10	44	1		6	2	3	16	68	**4,465**
	All	7	9	48	1		5	2	3	16	71	**5,802**
Indonesia 2007	Urban	(1)	18	21	4		19		17	19	77	**799**
	Rural	2	19	8	12	1	17	2	17	20	72	**1,381**
	All	1	19	13	9	1	18	2	17[c]	20	74	**2,180**
Nepal 2011	Urban	(11)	(4)	29	(1)		(26)			(15)	69	**65**
	Rural	2	20	13	3		23		1	22	61	**646**
	All	3	18	15	3		23		1	21	62	**711**

TABLE 3 (continued).

		Public Hospital	Public Periph HF	Private Clinic(ian)	CHW	NGO/ Religious	Pharmacy/ Shop Only	Non-Allopathic	Other	Any Public (not incl. CHWs)	Any Source	N[a]
Pakistan 2006–2007	Urban	7		64			(2)	7	(2)	8	78	**325**
	Rural	7	2	45	(1)		3	3	10	9	69	**732**
	All	7	2	51			3	4	8	8	72	**1,058**
Philippines 2008	Urban	5	21	12				7	(1)	25	45	**266**
	Rural	4	19	10			(1)	6	(2)	23	38	**294**
	All	4	20	11				6	2	24	41	**560**

[a] N values are adjusted (see Methods section). Note that point estimates for proportions based on adjusted Ns of less than 25 are indicated in parentheses, indicating a lower level of precision.

[b] This consisted mostly of "home of trained health worker."

[c] This consisted mostly of community nurse-midwives.

Abbreviations: CHW, community health worker; HF, health facility; NGO, nongovernmental organization.

TABLE 4. Quality of ARI Care by ''Received Antibiotics'' (%)

Survey		''Appropriate'' provider		''Non-appropriate'' provider	
		Sought care (A)	Received antibiotic (as a % of A)	Sought care (B)	Received antibiotic (as a % of B)
Africa					
Ethiopia	2011	27	70	2	(60)
Ghana	2008	51	35	14	(16)
Rwanda	2010	50	74	12	(28)
Senegal	2010–2011	50	50	10	(26)
Swaziland	2010	73	21	5	0
Uganda	2011	79	54	5	(49)
Zimbabwe	2010–2011	48	47	7	51
Asia					
Bangladesh	2011	35	83	47	79
Nepal	2011	48	37	29	61

Values in parentheses are based on cell sizes of less than 25.

TABLE 5. Quality of Diarrhea Care by "Appropriate" vs. "Non-Appropriate" Provider (%)

Survey		"Appropriate" Provider		"Non-Appropriate" Provider	
		Pills/syrups for non-bloody diarrhea	ORS	Pills/syrups for non-bloody diarrhea	ORS
West and Central Africa					
Benin	2006	-	63	-	14
DR Congo	2007	-	48	-	43
Ghana	2008	56	70	54	36
Guinea	2005	-	68	-	11
Liberia	2007	34	73	21	46
Mali	2006	-	50	-	4
Niger	2006	-	53	-	5
Nigeria	2008	62	51	57	20
Senegal	2010–2011	68	47	58	16
Sierra Leone	2008	75	84	78	59
Southern Africa					
Lesotho	2009	62	75	(44)	(10)
Madagascar	2008–2009	73	43	61	8
Malawi	2010	49	83	44	61
Namibia	2006–2007	36	87	(39)	(35)
Swaziland	2006–2007	61	94	(70)	58
Zimbabwe	2010–2011	49	45	(69)	(11)
Zambia	2007	50	86	67	26
East Africa					
Ethiopia	2011	50	62	52	(26)
Kenya	2008–2009	54	87	50	72
Rwanda	2010	62	64	57	(12)
Tanzania	2010	66	64	67	45
Uganda	2011	65	54	58	29
Asia					
Bangladesh	2011	-	87	-	77
Cambodia	2010	62	50	73	27
India	2005–2006	65	36	67	15
Indonesia	2007	74	56	80	26
Nepal	2011	48	63	66	42

TABLE 5 (continued).

Survey		"Appropriate" Provider		"Non-Appropriate" Provider	
		Pills/syrups for non-bloody diarrhea	ORS	Pills/syrups for non-bloody diarrhea	ORS
Pakistan	2006–2007	65	56	61	37
Philippines	2008	45	76	(37)	(54)

Values in parentheses are based on cell sizes of less than 25.
"-" is indicated for surveys for which a general question on types of treatment received for diarrhea was not asked.
Abbreviations: ORS, oral rehydration solution.

BOX 1. Nepal (DHS 2011)

Care seeking for ARI is high, particularly in Nepal's urban areas, with advice or treatment sought for close to 80% of cases (pneumonia is the leading cause of death among children under 5, beyond the newborn period, with diarrhea also an important cause but malaria not accounting for a significant proportion of deaths).[9] Children are twice as likely to receive care in the private as in the public sector. This is the case in both urban and rural settings; however, whereas private health workers are more commonly cited as a source of care in urban areas, retail outlets and private health workers are used at similar levels in rural areas. Although not apparent from these data, other research[5] has documented that in most instances when it is reported that care is sought from a shop, some assessment is made by a health worker at the shop before dispensing treatment, so they are in effect functioning as private clinics. Nepal has a well-established CCM program for childhood illness; however, the DHS data suggest that CHWs do *not* make up a significant fraction of the case-provision mix (and reported recourse to care from this source has declined since the 2006 DHS). Care seeking for fever shows a similar pattern to that for ARI, with a high level of care seeking, particularly in urban settings, and the private sector as the primary source. For diarrhea, care seeking is at a somewhat lower level overall and is lower in rural than in urban areas. As with ARI, the private sector is the most important source of care for diarrhea, particularly in urban areas.

Among those seeking care for diarrhea from "appropriate" or medically qualified providers, almost two-thirds reported receiving ORS versus a little under half among those seeking care from "non-appropriate" providers. "Appropriate" providers dispensed pills or syrups for half the cases of non-bloody diarrhea seen; two-thirds of cases seen by non-appropriate providers received pills or syrups. For ARI, those seeking care from "appropriate" providers were less likely to report receiving antibiotics than in most of the other countries for which we have data. However, most ARI care from "non-appropriate" providers included provision of antibiotics.

Implications for Program Strategy: Although the public sector is a significant source of care, it plays a considerably smaller role than the private sector. Thus, to improve population health outcomes, efforts are warranted to identify and address gaps in the appropriateness and quality of care provided in the private sector. Antibiotic use by "appropriate providers" for ARI cases seen was relatively (perhaps inappropriately) low in comparison with that in other countries. Although the overall national picture shows relatively high levels of care seeking and a modest role for the public sector, there may be sub-populations or geographic areas showing quite different patterns. In these cases, a strategy focused on improving the coverage and quality of public sector provision (including use of community health workers) may still be appropriate.

BOX 2. Ethiopia (DHS 2011)

Ethiopia has very low levels of care seeking for all 3 conditions (the lowest of the 29 countries analyzed by DHS in this paper for ARI and fever, and among the lowest for diarrhea), particularly in rural areas. Despite very low care seeking, under-5 mortality is lower than in many of the other African countries in this analysis. Those children who do get care are likely, in the case of ARI, to receive antibiotics, and, in the case of diarrhea, to receive ORS (although other pills and syrups are also commonly given). Private-sector care in Ethiopia is provided by health professionals (not at shops). For ARI, care is twice as likely to be sought from the public sector than from the private. This is also true for fever and diarrhea, although the private sector plays a slightly more important role than for ARI. Pneumonia is the leading cause of death among children under 5 beyond the newborn period[10] and therefore is an appropriate focus for program effort. Malaria does not account for a significant proportion of deaths.

Implications for Program Strategy: With very low overall coverage and a minor role for the private sector, increasing coverage will require extending the public sector's reach more deeply at the community and household levels, particularly in rural areas, where most of the population lives. Although not reflected in the data presented here, this is the intent behind recent moves to increase sick-child care provided by health extension workers.

BOX 3. Mali (DHS 2006)

Mali continues to have very high under-5 mortality. At the time of the last DHS (2006), care seeking for ARI was at a moderate level and primarily from peripheral-level public-sector health facilities, although non-allopathic providers and drug shops were also significant sources of care. Care seeking for fever was comparatively low, with a wide gap between urban and rural coverage. This is notable, given high malaria mortality. Care for fever was sought predominantly from the public sector, although in urban areas some care was sought from retail outlets. Non-allopathic practitioners were a relatively important source of care for fever. Care seeking for diarrhea was lower than for any other country analyzed, with marked rural-urban disparity, and ORS use was very low. Non-allopathic practitioners were also consulted, although less frequently than for fever. Malaria, pneumonia, and diarrhea account for similar proportions of deaths among children under 5 beyond the newborn period,[11] so all 3 warrant serious program attention.

Implications for Program Strategy: Coverage was very low for diarrhea; rural areas, in particular, were not well reached. Since use of the private sector is low, it would be important to extend peripheral public health services more effectively at the community and household levels in order to achieve better population health outcomes (noting that, along with Somalia and Sierra Leone, Mali has the highest under-5 mortality[12] of the 42 countries included in this analysis). Current efforts to expand access through a new cadre of community health workers appear to be an appropriate response in this situation. The relatively high use of traditional practitioners indicates that consideration could be given to working with this group to improve access to, for example, oral rehydration solution.

BOX 4. Uganda (DHS 2011)

Uganda is the one African country included in this analysis that showed a pattern of care seeking similar to that found in South Asia, relying primarily on private clinicians. For all 3 conditions, the proportion of cases of illness for which care was sought was high, and this was predominantly from ''appropriate'' providers, mainly private clinicians. Uganda was unusual among the countries included in this analysis in that in rural areas levels of care seeking were just as high as in urban areas, and, indeed, cases in rural areas were just as likely to be seen by private clinicians as in urban areas. Despite high levels of care seeking, child mortality is comparatively high. Quality of care appears to be an issue for diarrhea, as most cases of non-bloody diarrhea were treated with pills or syrups and fewer were given ORS. For ARI, slightly over half of those seen by ''appropriate'' providers reported having received antibiotics; this level may be compatible with appropriate use of antibiotics. Pneumonia is the number one cause of death among children under 5, beyond the newborn period, although malaria and diarrhea are also important causes.[13]

Implications for Program Strategy: Based on this analysis, *access* to services is less of a problem in Uganda than in the other countries considered. Care is primarily provided in the private sector, by presumably medically qualified practitioners. However, this analysis suggests problems of quality of care, with too little use of ORS for diarrhea and inappropriate use of other remedies for non-bloody diarrhea. Accordingly, it would be appropriate for program efforts to be directed at improving quality of care given by private-sector providers of sick-child care, notably for diarrhea. All 3 of the major childhood conditions considered here are important causes of death and warrant serious program effort.

BOX 5. Senegal (DHS 2010–11)

Compared with rates in other countries in West Africa, under-5 mortality in Senegal is comparatively low.[14] Malaria is the leading cause, followed by pneumonia and diarrhea.[15] Care seeking from any source was lower than in most other countries considered here across all 3 categories of childhood illnesses. For ARI and fever, care seeking is somewhat lower in rural areas than in urban. Care-seekers relied primarily on public-sector providers, and non-medically qualified providers were not an important source. Senegal was one of the first countries in Africa to adopt and scale up management of childhood illness by community health workers (that is, CCM). By the time of the last DHS survey, this program had been implemented in 58 of the 69 districts in the country (personal communication with Serge Raharison). It is surprising, therefore, that for none of the 3 conditions are community health workers reported to have provided care for more than 2% of cases.

Oral rehydration salts were dispensed less frequently than in most other countries considered. Prescribing various pills and syrups was more common. Half of cases of ARI for which a medically qualified provider was consulted received antibiotics.

Implications for Program Strategy: Since the private sector is not playing a prominent role in service provision, it would be sensible to focus program efforts on public-sector provision. The recent effort to expand access would seem appropriate given that care from any source has been lower than in many other countries (including some of Senegal's neighbors). However, the continued overall low level of care seeking and the very infrequent recourse to community health workers as a source of care suggests that there have been significant implementation problems with CCM. It would be warranted to investigate the factors that have contributed to the apparently poor performance of this program (such as availability of program commodities and acceptability of the providers) as well as the most significant barriers to obtaining care from public-sector health facilities. The relatively low rate of ORS dispensing also needs to be addressed.

Acknowledgments: This study was carried out with support provided by the U.S. Agency for International Development (USAID) through the MEASURE DHS project (#GPO-C-00-08-00008-00).

Competing Interests: None declared.

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Peer Reviewed

Received: 2013 Mar 8; **Accepted:** 2013 Jul 17; **First Published Online:** 2013 Nov 8

Cite this article as: Hodgins S, Pullum T, Dougherty L. Understanding where parents take their sick children and why it matters: a multi-country analysis. Glob Health Sci Pract. 2013;1(3):328-358. http://dx.doi.org/10.9745/GHSP-D-13-00023

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ORIGINAL ARTICLE

Obesity as a public health problem among adult women in rural Tanzania

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Even in rural areas of Tanzania, an early stage of the nutrition transition is underway: 3 times as many women were overweight or obese than were undernourished. Overweight and obese women mainly follow a diet characterized by high consumption of bread and cakes (usually fried or baked in oil), sugar, and black tea.

ABSTRACT

Background: For many developing countries, obesity and its sequelae have become a challenge of a magnitude similar to hunger and undernutrition. The main objective of this study was, therefore, to investigate the weight status of women in rural Tanzania with reference to season as well as the link between women's weight, food consumption, and attitudes toward obesity.

Methods: Three cross-sectional surveys in 3 different seasons within 1 year interviewed the same 210 women, ages 17–45 years, from 3 rural districts of northeastern and central Tanzania. These surveys assessed body mass index (BMI), food intake, and dietary diversity through 24-hour recalls, women's attitudes toward obesity, vegetable production, and socioeconomic status.

Results: Although 71% of the women had a normal BMI, 7% were underweight, 16% overweight, and 6% obese. The BMI was correlated with the Dietary Diversity Score (DDS), the Food Variety Score (FVS), with the consumption of foods from the food groups ''bread/cakes,'' ''sugar,'' and ''tea,'' and with the production of exotic vegetables. In a multiple regression model, FVS was directly associated with BMI. When asked to describe the typical characteristics of an obese person, women mentioned more negative than positive characteristics.

Conclusion: The prevalence of overweight and obesity was 3 times higher than that of underweight. Apparently, even in rural areas of Tanzania, a nutrition transition is underway. No direct association was identified between vegetable consumption and BMI. Although this study did not assess behavioral factors, such behavioral factors as activity levels as well as attitudes need to be considered, even in rural settings, to address all facets of malnutrition.

BACKGROUND

In 1997, a World Health Organization (WHO) consultation formally recognized that the obesity epidemic occurs worldwide and is not limited to the developed world.[1] Globalization of food markets, urbanization, and economic growth are the main drivers of this development.

In developing countries, profound societal changes and new behavioral patterns have emerged during the last decades that affect nutritional patterns.[2,3] An early stage of the nutrition transition—and a typical trend in developing countries—is characterized by increased consumption of cheap vegetable oils that are rapidly integrated into local diets as additional food items. At a later stage, the nutrition transition, as it usually occurs in more wealthy countries, is marked by increased consumption of meat, milk, processed food, and soft drinks together with an increase in the share of food consumed away from home.[4] At the same time, changes toward a sedentary lifestyle and less physical activity take place. Thus, not only the diet but the whole environment can be ''obesogenic''[5] (promoting excessive weight gain), contributing to increased levels of obesity.

For many developing countries, obesity and its sequelae have become challenges of magnitude similar to those of hunger and undernutrition.[6,7] As a result, the

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The coexistence of undernutrition in terms of micronutrients and overnutrition in terms of calories leads to a double burden of malnutrition.

coexistence of undernutrition in terms of micronutrients and overnutrition in terms of calories leads to a double burden of malnutrition, not only at the population level[8] but also in households.[9,10] This emerging pattern requires far more attention, and urgently.[11] Indeed, many poor countries face a ''triple burden'' of malnutrition—the coexistence of hunger, micronutrient deficiency, and excess intake of calories.[12]

Food-based strategies using traditional and locally available agrobiodiversity and promoting consumption of a wide range of foods across nutritionally distinct food groups would benefit not only individuals but also the household and even the community that might be suffering from this triple burden of malnutrition. However, these approaches are still largely neglected and under-researched.

In Tanzania, data on obesity levels exist mainly for urban areas—for example, for Dar es Salaam, where in 1 municipal district, the overall prevalence of obesity was 19.2%, as measured among 1,249 adult male and female subjects[13]; and for Morogoro in central Tanzania, where a prevalence of overweight and obesity was 25% among 100 adults and 40 pupils.[14] The prevalence of overweight and obesity has been found to be significantly higher in urban Dar es Salaam than in rural Handeni and Monduli for both men and women.[15] Thus, while the obesity problem has been assessed and is acknowledged in urban areas, trends in rural areas are less investigated.

The present study aimed at investigating the weight status of adult women in rural Tanzania as measured by body mass index (BMI) as well as linkages between weight status, food consumption, and vegetable production. The focus on vegetable production is meant to investigate relationships between agricultural patterns and health.[16] In addition, we studied women's attitudes toward corpulent (overweight) people, as the social perception of body shape and size can be decisive to behavior, and in many African societies overweight has been associated with wealth, health, and beauty, or in general has a positive connotation.[17–20]

METHODS

Timing and Study Location

For this cross-sectional study, 3 surveys during different seasons within 1 year were conducted, namely, during the dry season in June/July, the short rainy season in November/December, and the end of the dry/beginning of the long rainy season in March/April. The districts and villages for this study were some of those already visited in preceding survey research[21,22]—6 villages each in 3 different districts of northeastern and central Tanzania: Kongwa, Muheza, and Singida. We chose districts and villages so as to have significant differences in a variety of factors, such as climate, altitude, ethnic group, and distance to urban centers.

Study Participants

Participants were women selected through systematic sampling in each of the 18 villages by the responsible village extension officer and on the basis of household lists, which were organized by family name (every k^{th} household, whereby k = number of households/sample size). Selection criteria included age between 15 and 45 years and cultivation of vegetables.

Initially, 360 participants were included (120 per district, 20 per village). This number was determined using empirical values of preceding studies and calculating what was possible for a repeated study in the given time and budget frame. Excluded from the analysis were women in the second or third trimester of pregnancy (35 women), as their BMIs cannot be compared with those of non-pregnant women. Similarly, women in the second or third trimester of pregnancy during the second or third survey of this study were then also excluded from the analysis (although they still were allowed to participate). Also excluded were women who had tuberculosis (4 women), according to their own statements, or HIV/AIDS (5 women), according to 7 standard questions on clinical criteria defined by WHO that were asked during the interview, as these conditions also might influence the BMI. Further, 106 women were dropped from the analysis as they were not able to participate in all 3 surveys for various reasons, such as traveling, illness, or who had moved. All remaining women—210 who attended all 3 study sessions—were included, meaning that the same 210 women were interviewed and measured 3 times.

Ethical clearance for this study came from the ethical clearance committee of the faculty of medicine at Justus Liebig University of Giessen, Germany. The study also was approved, and permission for the research was given, by Sokoine University of Agriculture, Morogoro, Tanzania. Oral informed consent was obtained during recruitment from each woman enrolled,

as is common practice in communities where some residents are illiterate.[23]

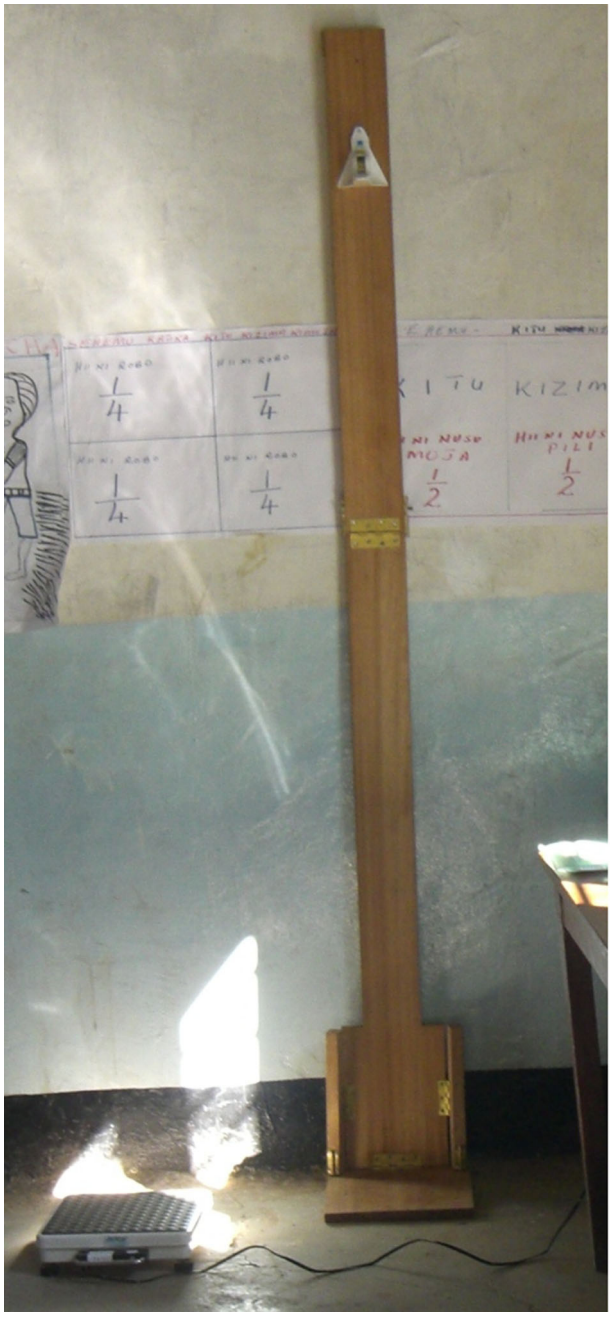
Data Collection

Women's heights were measured to the nearest 0.1 cm with a person-check (Kirchner & Wilhelm, Asperg, Germany) fixed to a portable wooden measuring board with a foot rest, on which women stood barefoot and without headgear. Weights were measured with a calibrated person standing scale (Seca 862, Seca Co., Hamburg, Germany), on which women were examined barefoot and with minimal clothing according to the FANTA (Food and Nutrition Technical Assistance) protocol.[24] From body height and weight, we calculated the BMI for each participant (BMI = weight in kg/height in m^2). These anthropometric measurements were taken during all 3 surveys.

Participants were interviewed individually during all 3 surveys. The interview, which took 15 to 30 minutes, included a semi-quantitative 24-hour recall of food consumption. To assess the quantity of food eaten, respondents could indicate any 1 of 3 containers to estimate portion sizes; other measures were local cups and spoons. For each food and dish named during this survey, the amount in grams that fits in each of the 3 containers was obtained to serve as a reference for calculating the amounts of foods that participants ate.

Additional questions addressed socioeconomic status (only during the first survey). including household size, distance from village to town, religion, occupation, marital status, and wealth as well as ethnic group and education of participants. The wealth status of each woman was calculated according to the number of possessions including livestock, setting of the house, type of occupation, and whether she sold vegetables.

Regarding vegetable production and collection from the wild, indigenous and exotic varieties were assessed in all 3 surveys in terms of the type and number of types cultivated or collected per woman. Indigenous vegetables included, especially, green leafy vegetables such as amaranth, African nightshade, and spiderplant, but also some fruit vegetables, such as African eggplant, indigenous to Tanzania and East Africa.[21] Exotic vegetables comprised vegetables introduced from other regions, usually bred for a long time already, such as tomato, onion, cabbage, or carrot.



A portable scale and measuring board allowed the researchers to collect anthropometric measurements from study participants during all 3 household surveys.

Finally, during the second survey, the women were asked to mention typical associations with obesity (''a person being very corpulent'') as an open-ended question. Participants' answers were summarized in categories afterwards. Physical activity was assessed during the second and third

surveys on a visual analogue scale. Participants rated their own physical activity on an average day on a scale between 0, meaning no physical activity (sleeping), and 10, meaning extremely strenuous physical activity. These subjective data can mainly show changes among individuals between 2 points in time[25]; thus, they were not used in the analysis for this paper.

The questionnaire was developed in English, translated into Kiswahili, in which the interviews were conducted, and translated back into English to cross-check that the correct meaning was maintained. The survey was pretested with 8 women in Arumeru district, Tanzania.

Data Analysis

All data were checked for normal distribution in order to know whether nonparametric tests (for abnormally distributed data) had to be applied. Women were grouped into 4 categories by BMI status according to WHO categories (2008)[3] for both women and men ages 15 years or older, namely, underweight (BMI < 18.5 kg/m^2), normal weight (BMI $= 18.5$–24.9 kg/m^2), overweight (BMI $= 25.0$–29.9 kg/m^2), and obese (BMI ≥ 30.0 kg/m^2).

Food intake was analyzed for nutrient composition with NutriSurvey for Windows©. The Dietary Diversity Score (DDS) was calculated by summing up the number of food groups consumed by an individual over a 24-hour recall period, while for the Food Variety Score (FVS), single foods were counted.[26] As there is no international agreement on using certain food groups for standardized nutritional analysis,[28] we allocated 76 different foods to 14 groups.[27,28] Then, this system was adapted to food items identified during the survey and used for calculating DDS and FVS.[27,28]

To characterize the dietary patterns of the participating women, we took an exploratory approach, namely, principal component analysis (PCA). After initially performing the PCA with different numbers of food groups, we found that 12 food groups were best suited to determining dietary patterns among the study participants; all animal sources were grouped together, excluding fish, which is seldom eaten. Five dietary patterns were derived through PCA[29] based on the mean intake in g/day of the different food groups (mean value from 3 24-hour recalls). For details on the creation of the dietary patterns and criteria for arriving at 5 patterns, see Keding et al.[30]

As the BMI data were not normally distributed either for all districts together or for each district individually, we used nonparametric tests to check for differences between seasons (Friedman test) and between districts (Kruskal–Wallis test). As differences were only slightly significant among the seasons (P=.045) and not significant among the districts, we used the median BMI of the 3 seasons for all 3 districts combined for further calculations. We used the median BMI instead of the mean, as the data were not normally distributed.[31]

Associations with other variables were tested through both bivariate correlations and multiple regression models. Relationships between categorical variables were assessed with the chi-square (χ^2) test; and those between continuous variables were tested with the nonparametric Spearman rank correlation coefficient, rho (ρ). All statistical analyses were carried out with the Statistical Package for the Social Sciences (SPSS), version 16.0.

Interviewers showed study participants 3 different-sized containers to help them estimate portion sizes of the foods they ate.

RESULTS

Table 1 shows the main characteristics of study participants. The mean age of respondents was 33.7 years. While in Kongwa and Singida districts, 1 or 2 ethnic groups dominated, in Muheza district several different ethnic groups were present. Most of the participants (90%) had attended primary school, and nearly all of them cultivated or collected indigenous vegetables

TABLE 1. Characteristics of the Women Interviewed in 3 Districts of Tanzania

Characteristics	All Districts	District 1 (Kongwa)	District 2 (Muheza)	District 3 (Singida)
N	210	52	69	89
Age, mean, y	33.7	30.8	34.6	34.8
Ethnic group (%)				
Bondei	7.6	0.0	23.2	0.0
Gogo	13.3	53.8	0.0	0.0
Kaguru	7.1	28.8	0.0	0.0
Nyaturu	41.9	3.8	0.0	96.6
Shambaa	11.4	13.5	34.8	0.0
Other	18.6	0.0	42.0	3.4
Education (%)				
Illiterate	7.6	7.7	8.7	6.7
Primary school	90.0	88.5	88.4	92.1
More than primary	2.4	3.8	2.9	1.1
Wealth status[a] (%)				
Low	26.7	30.8	33.3	19.1
Medium	29.0	36.5	29.0	24.7
High	44.3	32.7	37.7	56.2
DDS (median across seasons)[b]	6	5	8	4
FVS (mean across seasons)[c]	8.4	7.2	10.9	7.2
Cultivating/collecting indigenous vegetables (%)	98.1	98.1	99.0	97.4
Cultivating exotic vegetables (%)	31.1	12.2	16.9	53.2

[a] According to number of possessions, setting of the house, number of livestock, type of occupation, and whether vegetables were sold.
[b] DDS, Dietary Diversity Score, calculated by summing the number of food groups consumed by an individual over a 24-hour recall period.
[c] FVS, Food Variety Score, counting single foods over a 24-hour recall period.

(98.1%), while only 31.1% cultivated exotic vegetables. The median DDS was 6 different food groups consumed per day, while the mean FVS was 8.4 different foods consumed per day.

Diets with low diversity scores were characterized by a simple but not necessarily unhealthy diet consisting mainly of cereals, vegetables, and pulses, also called grain legumes. With increasing scores, foods such as sugar, beverages (black tea), or animal products were consumed as well. Mean nutrient intakes were calculated using the average of 3 days: the mean energy intake of all participating women was determined to be 1,893 kcal/day, mean protein intake was 60.4 g/day, mean fat intake was 41.3 g/day, and mean carbohydrate intake was 330.3 g/day.

The overall median BMI was 21.7 kg/m^2 (range 14.9–37.7 kg/m^2). BMI was highest for the coastal district Muheza and for the November/December (short rains) season (Table 2). In terms of BMI categories, only 7% of all participants were underweight (in Kongwa less than 2%), while 16% were overweight and 6% obese. If the latter 2 categories are combined, more than 20% of participating women had a BMI above 25 kg/m^2. Detailed data on DDS and FVS have been published elsewhere.[32]

TABLE 2. Median Body Mass Index (BMI) Values and Percent Distribution in 4 BMI Categories of Interviewed Women, by District and Season, Rural Tanzania

				Distribution by weight category (%)			
	N	Median (kg/m^2)	Range (kg/m^2)	Underweight (<18.5 kg/m^2)	Normal (18.5–24.9 kg/m^2)	Overweight (25.0–29.9 kg/m^2)	Obese (⩾30 kg/m^2)
All districts/seasons	210	21.7	14.9–37.7	7.1	71.0	15.7	6.2
Kongwa	52	21.6	17.7–34.7	1.9	75.0	19.2	3.8
Muheza	69	22.5	14.9–37.7	8.7	66.7	14.5	10.1
Singida	89	21.4	16.4–35.2	9.0	71.9	14.6	4.5
June/July (dry season)	210	21.7	14.3–37.3	6.7	71.9	15.2	6.2
November/December (short rains)	210	21.9	15.3–37.7	8.1	70.0	15.7	6.2
March/April (long rains)	210	21.7	12.3–37.2	10.0	68.6	14.8	6.7

BMI was directly correlated with intake of bread/cakes, sugar, and tea.

Factors Related to BMI

BMI was directly correlated with both the FVS (Figure 1) and the DDS (Figure 2), suggesting that the greater the diversity of foods and food groups eaten, the higher the BMI. Furthermore, BMI was directly correlated with the intake of certain food groups among the 12 food groups used to categorize dietary patterns. These groups were "bread/cakes" (ρ=0.240; P<.001), "sugar" (ρ=0.259; P<.001), and "tea" (ρ=0.216; P=.002). Also, BMI was correlated with the second dietary pattern (ρ=0.192; P=.005). Pattern 2 is defined by a high consumption of bread/cakes (usually fried or baked in oil), sugar, and tea. Overweight women had overall higher factor scores for this pattern, and the mean factor score for obese women was highest, meaning that they followed this pattern to a great extent.

Bivariate correlation was not found between BMI and any socioeconomic parameter or between BMI and the intake of single nutrients such as fat, protein, vitamin A, or iron, as calculated from the 24-hour recall data. When BMI values were compared with vegetable production/collection, the only significant association found was between production of exotic vegetables and BMI (ρ=−0.164; P=.017).

We performed multiple regression analyses to study the influence of multiple independent variables on the BMI. Predictors considered were age, dietary pattern 2, FVS, education, and residence (district). The residence of participants and education as nominal variables were transformed into dummy variables to include them in the model and control for them. The significance of this regression model was P=.005, while R^2 was 0.096 and the adjusted R^2 was 0.064. In this model, only the FVS showed a significant correlation with the BMI (P=.046; e^B=1.014) while controlling for the other variables (Table 3). This result suggests that, as the FVS increased by 1 food group, the mean BMI increased by 1.4%; for example, if the FVS increased by 5, the mean BMI increased by 7%.

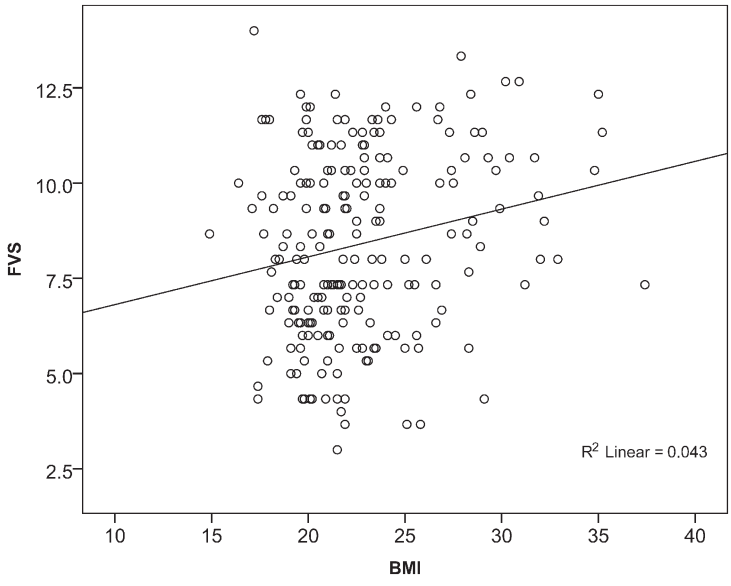
Attitudes Toward Overweight

The open-ended question, "Which typical positive and/or negative properties or qualities would you associate with a person being very corpulent?" sought to elicit participants' attitudes toward overweight and obesity. The number of positive and negative features for a corpulent person named by participants did not show a normal distribution. In general, participants mentioned far fewer positive characteristics (median 0, range 0–6) than negative characteristics (median 3, range 0–7). More than 60% of women (in Muheza, only 47%) gave no example of a positive characteristic of a corpulent person, while nearly all participants expressed 1 or more

negative attitudes. When numbers of positive and negative examples were compared, 71% of participants named more negative than positive characteristics for a corpulent person, only 5% named more positive than negative, while 24% were indeterminate. Only one-third of study participants linked overweight with beauty, and even fewer associated overweight with good health.

The most common positive characteristics were ''person is attractive, beautiful, looks good'' (34%) and ''person has good health, no disease, much blood'' (20%) (Figure 3). The most often named negative characteristics were ''person has/can get high blood pressure, heart disease, stroke'' (24%) and ''person cannot walk, run, climb, sit, and is not fit'' (22%) (Figure 4). When we grouped the number of negative characteristics named by participants into 3 categories (0–2 negative characteristics named [low], 3 [medium], 4–7 [high]), the number of negative characteristics was found to be significantly associated with the ethnic group of participants (P=.01). Respondents' attitudes toward obesity showed no association with their own BMI for any of various measures—negative characteristics only, both negative and positive characteristics, attitude categories, and BMI categories.

FIGURE 1. Association Between Body Mass Index (BMI) and Food Variety Score (FVS) (N=210; ρ=0.204; P=.003)



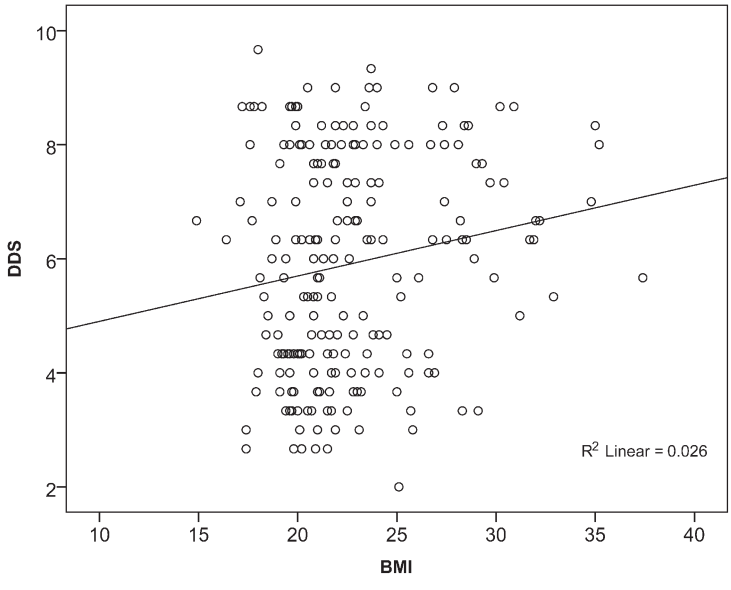
DISCUSSION

In this study on linkages between rural women's BMI, food consumption, attitude toward obesity, and vegetable production as well as on the weight status of rural women in general, the median BMI (21.7 kg/m^2) of the 210 participants was well within the range of normal weight. However, taking overweight and obesity together, the share of participants with a median BMI above 25 kg/m^2 was 3 times higher than that of participants with a median BMI below 18.5 kg/m^2 (indicating undernourishment).

Overweight/Obesity Prevalence in Rural Versus Urban Settings

In general, data on overweight and obesity in sub-Saharan Africa are scarce. In Tanzania, most studies deal with obesity in urban areas or compare rural and urban areas. For example, in Moshi, a town in the Kilimanjaro region, 70% of 50 surveyed patients with diabetes were found to be overweight.[33] In Morogoro town in central Tanzania, 100 adults (ages 19–50 years) and 40 pupils (ages 14–18 years) from 4 educational

FIGURE 2. Association Between Body Mass Index (BMI) and Dietary Diversity Score (DDS) (N=210; ρ=0.147; P=.03)



Three times as many women were overweight or obese than were undernourished.

institutions were examined; 25% were overweight or obese. The prevalence of obesity increased with age, and employed persons had higher rates than pupils.[14] In our study, the prevalence of overweight and obesity was nearly the same (22%) as in the Morogoro study; however, all participants were from rural areas, showing that overweight and obesity are no longer an urban issue only.

A cross-sectional epidemiological study of 545 men and women ages 46–58 years found that the prevalence of overweight and obesity were significantly higher in urban Dar es Salaam than in rural Handeni and Monduli among both men and women.[15] In a multi-country study with the focus on urban Africa, recent analysis of national BMI data on women found that the prevalence of BMI $\geqslant$ 25 kg/m^2 exceeded that of BMI $<$ 18.5 kg/m^2 in 17 of 19 countries.[34] While our study did not compare rural and urban areas, our findings are similar to those of the cross-country study in that the prevalence of overweight/obesity exceeded that of underweight—however, not in urban but rather in rural Africa.

Additionally, the ratio of overweight/obese to underweight participants of 3.1 for the whole study population is similar to the ratio of 3.3 found in a 1996 study of urban Tanzanian women ages 20–49 years, whereas then the ratio was only 1.2 for rural women.[34] Again, this study confirms a trend of higher prevalence of overweight than underweight, even in rural areas.

Direct comparisons between under- and overweight prevalence often look at the coexistence of obesity and underweight in either mother–child pairs[35,36] or in adolescents.[37] The dual burden of malnutrition in the same household is increasingly reported. However, no clear associations between this dual burden and socioeconomic parameters of households have been found,[35] and no specific risk factors have been identified so far.[36]

Association of BMI With Food Intake

BMI values were related to both the DDS and FVS. This relationship indicates that higher dietary diversity and, especially, food variety were associated with higher BMI values (Figure 1 and Figure 2). Multiple regression analysis indicated that, with an increase in FVS, the mean BMI increased. This would be, in general, a positive trend. Nevertheless, when food diversity increased in this study, the additional foods were often sugar, beverages (black tea), or animal products.

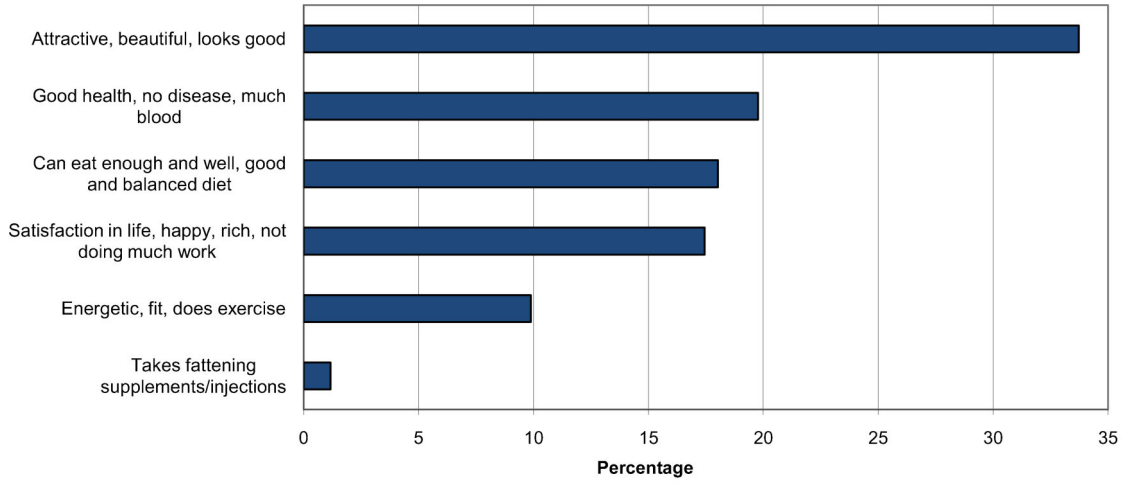
Along with overall dietary diversity, the types of food and the amount consumed must be considered.[32] Foods such as vegetables, legumes, and fruits are often culturally less desired, and, especially, in many sub-Saharan African countries, indigenous vegetables are seen as survival food for poor people.[38] In general, it must be emphasized that, while obesity and related chronic diseases are becoming more and more

TABLE 3. Results of Multiple Regression Analysis With ln(BMI) as Dependent Variable, 210 Women from 3 Districts of Tanzania, Mean Across 3 Seasons if Applicable

	Unstandardized coefficients		Standardized coefficients			
	B	SE	β	t	*P*-value	e^B
(Constant)	2.898	0.079		36.486	.000	
Age	0.003	0.002	0.121	1.748	.08	1.003
Low education	0.068	0.041	0.112	1.642	.10	1.070
High education	−0.092	0.072	−0.086	−1.277	.20	0.912
Kongwa	0.020	0.029	0.053	0.692	.49	1.020
Muheza	−0.032	0.034	−0.093	−0.935	.35	0.969
Dietary Pattern 2	0.022	0.013	0.139	1.682	.09	1.022
FVS	0.014	0.007	0.204	2.008	.046	1.014

Abbreviations: BMI, body mass index; FVS, Food Variety Score; ln, natural logarithm of; SE, standard error.
e^B = inverse of the natural logarithm of B.

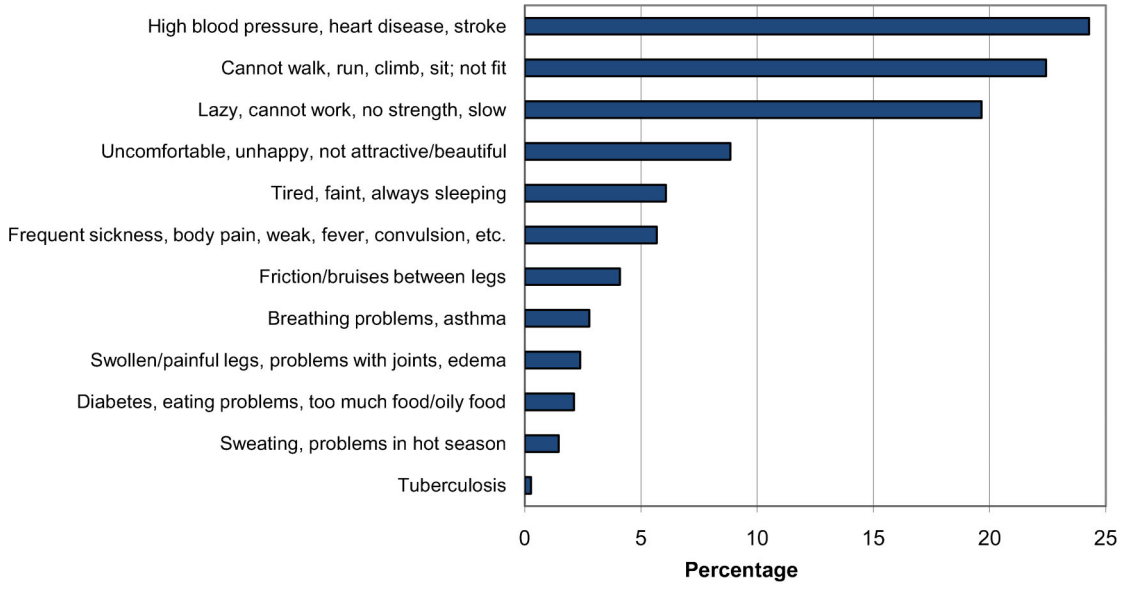
FIGURE 3. Proportion of Women From 3 Districts in Tanzania Associating Positive Characteristics With a Corpulent Person (multiple answers possible)



serious public health problems in developing countries, at the same time, the prevalence of micronutrient malnutrition is likely to remain high.[39] Both problems should be addressed by promoting a diet that is not only diverse but also balanced and healthy.

When considering the consumption of different food groups (g/day), we found that only

FIGURE 4. Proportion of Women From 3 Districts in Tanzania Associating Negative Characteristics With a Corpulent Person (multiple answers possible)



some food groups were positively correlated with BMI. Foods in the group ''bread/cakes,'' comprising either assorted purchased or homemade types of cakes and breads, usually fried or baked in oil, contain a high amount of fat. Therefore, it was not surprising that participants who consumed a large amount of this food group had a higher BMI. These breads and cakes are usually made of wheat or rice, which replace the traditional starch sources millet and cassava. Although, of course, the consumption of wheat and rice does not, in itself, lead to weight gain, this change implies new processing techniques: Frying in oil replaces cooking in water, and products are often processed further with some kind of fat.[40] Similarly, in China a vegetable-rich diet was, unexpectedly, found to be associated with obesity. The explanation for this was that the vegetables were stir-fried in oil.[41]

Respondents cited more negative than positive characteristics of overweight people.

Black tea, a very common drink in Tanzania, is drunk mostly with a large amount of sugar in it, and both food groups—''tea'' and ''sugar''—were consumed to a great extent by study participants with a high BMI. Regarding sugar, this was not surprising, as the amount of calories consumed was, most likely, often in excess of the need. Even slightly excess food energy intake daily leads to higher body weight in the long run. A study of women in the United States, for example, found that higher consumption of sugar-sweetened beverages was associated with a higher degree of weight gain and an increased risk for developing type 2 diabetes.[42] In general, an increasing intake of sugared soft drinks has been observed in developing countries,[43] although not in this study. Nevertheless, in Tanzania as elsewhere, carbonated soft drinks with high sugar content are becoming available even in the smallest corner shops in remote villages. Soon, commercial sugared beverages, particularly carbonated soft drinks, may become a key contributor to an epidemic of overweight and obesity in rural Tanzania, as they have elsewhere.[43,44]

Association of BMI With Vegetable Production

The production of exotic vegetables (number of types that a woman cultivated) was inversely associated with BMI; that is, women who grew exotic vegetables were likely to have lower BMI values. This association was not very strong, but it is rather puzzling, as the production of exotic vegetables—in contrast to that of indigenous vegetables—is usually associated with knowledge and a certain degree of wealth, because seeds and further inputs have to be purchased. Several studies suggest a positive association between wealth and BMI in developing countries.[3,6,45] Thus, it would be expected that exotic vegetable production would be associated with a higher BMI. However, our study found the opposite. We did not assess it in this study, but it is a relevant question whether exotic vegetables are mainly—or even exclusively—sold and so do not directly affect household food and nutrition security, but rather only contribute to the general wealth of a family. Our study could not confirm an association of wealth with BMI, possibly because all study participants had rather similar wealth status, as is typical in rural areas, and because the association between wealth and BMI might be, in general, more pronounced in urban areas.

Attitudes Toward Overweight

It was not clear whether study participants associated a corpulent body with wealth, health, and beauty, as studies in Mauritania[17] and Morocco[19] have found. In Tanzania, as well, it has been suggested that especially overweight and obese women are perceived as beautiful; they are admired and respected, while skinniness is associated with illnesses, especially HIV/AIDS, and, therefore, is not desirable.[46] Thus, we expected that study participants would name more positive than negative characteristics of corpulence. However, the share of participants naming more negative than positive characteristics was much greater than those indicating mostly positive features.

The circumstances under which interviews were conducted must be considered carefully; participants may have given answers that they expected the interviewer wanted to hear, as may happen in any interview. Nevertheless, as participants mentioned a number of ''technical medical terms'' associated with corpulence, such as diabetes and edema, they must have previously heard about problems related to overweight and were, apparently, already sensitized to these topics. Assuming that all women said what they thought, the question arises why the majority of these study participants in rural Tanzania no longer thought in the traditional way but instead were already sensitized to obesity as a health problem.

Regarding the correlation between women's attitudes and ethnic group, it is possible that women of different ethnic backgrounds have different attitudes toward body image and overweight.

Different body image perceptions have been identified among Australian school children from varying ethnic groups.[47] Similarly, a cross-cultural study with participants from Europe, India, Japan, Oman, the Philippines, and the United States found cultural differences in the drive for thinness as well as attitudes toward eating.[48] In our study these different perceptions by ethnic groups coincided with differences among the districts, which are inhabited by different ethnic groups. Consequently, even within the rural area of one country, ethnic differences need to be considered.

In general, the BMI cutoff point of 25 kg/m^2 must be reconsidered. In the United States, the link between weight and mortality has recently been assessed; underweight, obesity, and, especially, extreme obesity (BMI $\geq$ 35 kg/m^2) were associated with increased mortality, yet, overweight (BMI = 25 to $<$ 30 kg/m^2) was not.[49] Thus, while obesity is an obvious health risk, this is not necessarily true for overweight, depending on the age, sex, and ethnicity of a person. Especially in countries or regions with recurrent food shortages and high disease prevalence, it should be considered that people who are slightly overweight may be healthy and have higher chances of longevity than lean people.

CONCLUSIONS

For this study the same participants were tracked during 3 different seasons in 1 year, thus creating rather robust data regarding seasonal changes in food intake and weight status, although seasonal differences were minor or nonexistent. Furthermore, as most studies in Tanzania so far have focused on urban areas or rural–urban comparisons, this study makes a new contribution by focusing on rural residents only.

In general, data obtained through interviews always must be handled with care, as interviews have some disadvantages that cannot be avoided. Dietary recall, for instance, relies on the respondent's memory as well as on her ability to estimate portion sizes. However, since the survey was interviewer-administered and participants did not have to record their food intake themselves, the data were collected from all respondents in a consistent manner.[50]

In this study of adult women in rural Tanzania, overweight and obesity were more prevalent than underweight. The 3 main reasons for the obesity epidemic in developing countries are changing food consumption habits, cultural attitudes toward overweight/obesity, and decreasing physical activity.[4,8] Our study found an indication of only the first reason, namely, changing food consumption habits, when comparing to former eating habits assessed in a previous study;[40] no indication was found for cultural attitudes and physical activity was not assessed.

The fact that participants had more negative than positive associations with overweight and obesity indicates their awareness of the resulting problems. This may be relevant for public health interventions aiming at prevention at the population level as well as the individual level.

While it can be argued that the high BMI values of people in urban areas of Tanzania are, most likely, due to changing lifestyles, food consumption habits, and physical activity patterns, it still needs to be determined how a similar trend toward high BMI is possible in rural Tanzania. Even without the presence of Western fast food chains, consumption of cheap vegetable oils is increasing. An early stage of the nutrition transition is obviously underway, even in rural areas. No direct association between vegetable consumption and BMI was found. Along with vegetables as part of a balanced diet, behavioral factors, including attitudes and activity levels, need to be considered even in rural settings to address all facets of malnutrition.

An early stage of the nutrition transition is underway in Tanzania, even in rural areas.

Acknowledgments: The authors acknowledge the cooperation and contributions of all participating women; the horticultural extension workers in the districts; AVRDC-RCA and HORTI Tengeru staff; students and staff from Sokoine University of Agriculture, Morogoro, as well as from Kilimanjaro Christian Medical Centre, Moshi. We gratefully acknowledge financial support by the German Federal Ministry for Economic Cooperation and Development/Deutsche Gesellschaft für Technische Zusammenarbeit (BMZ/GTZ), the German Academic Exchange Service (DAAD), and Foundation fiat panis (formerly Eiselen Foundation), Ulm, Germany.

Competing Interests: None declared.

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Peer Reviewed

Received: 2013 Jun 6; **Accepted:** 2013 Oct 14

Cite this article as: Keding GB, Msuya JM, Maass BL, Krawinkel MB. Obesity as a public health problem among adult women in rural Tanzania. Glob Health Sci Pract. 2013;1(3):359-371. http://dx.doi.org/10.9745/GHSP-D-13-00082

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ORIGINAL ARTICLE

Early pregnancy detection by female community health volunteers in Nepal facilitated referral for appropriate reproductive health services

Kathryn Andersen,[a] Anuja Singh,[b] Meena Kumari Shrestha,[b] Mukta Shah,[b] Erin Pearson,[a] Leila Hessini[a]

Trained female community health volunteers provided low-cost urine pregnancy tests in their communities, leading to counseling and appropriate referrals for antenatal care, family planning, or comprehensive abortion care.

ABSTRACT

Background: Female community health volunteers (FCHVs) are a possible entry point for Nepali women to access timely reproductive health services at the village level. This evaluation assessed the success of a pilot program that trained FCHVs in early pregnancy detection using urine pregnancy tests (UPTs), counseling, and referral to appropriate antenatal, safe abortion, or family planning services.

Methods: Between July 2008 and June 2009, the program trained 1,683 FCHVs from 6 districts on how to provide UPTs and appropriate counseling and referral; 1,492 FCHVs (89%) provided follow-up data on the number of clients served and the type of services provided. In addition, the program conducted in-depth interviews with selected FCHVs and other reproductive health service providers on their perceptions of the program.

Results: Of the FCHVs with follow-up data, 80% reported providing UPTs to women in the 8-month follow-up period. In total, they conducted 4,598 UPTs, with a mean number of 3.1 tests per FCHV. Among the women with a negative pregnancy test (47%), FCHVs provided 24% of them with oral contraceptive pills and 20% with condoms; referred 10% for other contraceptive services; and provided contraceptive counseling only to 46%. Among the women with positive pregnancy tests (53%), FCHVs referred 68% for antenatal care and 32% for safe abortion services.

Conclusions: Providing FCHVs with the skills and supplies required for early pregnancy detection allowed them to make referrals for appropriate reproductive health services. Results of this evaluation suggest that community health workers such as FCHVs are a promising channel for early pregnancy detection and referral. As the intervention is scaled up, the focus should be on ensuring service availability and awareness of available services, UPT supply, and creating viable options for record keeping.

BACKGROUND

Timely identification of pregnancy is important for initiating antenatal care (ANC) among women with wanted pregnancies and for seeking abortion services among women with unwanted pregnancies. Although abortion is a safe procedure, the medical risk is greater at higher gestational ages.[1] In addition, early identification of an unwanted pregnancy is important so that women can access abortion services before they exceed the legally allowed gestational limit.

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Lack of certainty about pregnancy status can cause delays in seeking ANC or abortion. For example, a study of ANC clients in South Africa found that women waited up to 5 months gestation before feeling confident that they were pregnant and seeking care, and women expressed difficulties with identifying pregnancy when menses are typically irregular.[2]

Urine pregnancy testing has been shown to decrease the gestational age at which women seek antenatal care and abortion services.[3–4] A study in South Africa showed that women who used urine pregnancy tests (UPTs) presented for ANC services 3.6 weeks earlier, and abortion clients 1.4 weeks earlier, than women who did not use UPTs.[3] Another

study from South Africa found that introducing a pregnancy confirmation clinic using UPTs within existing ANC clinics decreased the mean gestational age at which women began ANC.[4] Although this study used facility-based distribution of pregnancy tests, community-based provision of pregnancy tests may further increase access to reproductive health services, especially in rural areas.

In Nepal, ANC and comprehensive abortion care (CAC) services are available in government facilities, but women often delay seeking services due to geographical barriers and social barriers against traveling alone to health facilities.[5] In addition, husbands and mothers-in-law in Nepal often act as gatekeepers who prevent women from accessing health services.[6]

The World Health Organization (WHO) recommends at least 4 ANC visits, starting as early as possible in the first trimester.[7] But in Nepal, the median gestational age at the first ANC visit is 3.7 months, indicating that many women are not seeking services until their second trimester.[5]

Under Nepal's current abortion law, implemented in 2004, women have the legal right to an abortion up to 12 weeks of gestation for any indication; up to 18 weeks of gestation in the case of rape or incest; and at any time during pregnancy, if the mental or physical health or life of the pregnant woman is at risk or if the fetus is deformed and incompatible with life, with the advice of a medical practitioner.[8] Access to services in the first trimester is important for both ANC and CAC clients.

Increasing the availability of urine pregnancy testing in Nepal may be one way to enable women to identify pregnancy earlier and seek more timely ANC or CAC services. Currently, UPTs are available in Nepal through medical shops, but access is limited in remote areas and cost can be a barrier. The cost of UPTs in medical shops outside the capital Kathmandu ranges from Rs. 50–60 (US$0.58–0.70), which is almost half the daily income for the majority of Nepal's population (78%) living below US$2 per day.[9]

One promising approach, started by Nepal's Ministry of Health and Population in 1988, uses community-based volunteers, known as female community health volunteers (FCHVs), to reach women in remote areas and link them with available services. This network, currently comprising more than 48,000 local female volunteers,[10] is a trusted source of maternal and child health information and serves as the key referral link between communities and health services.

Women who are unsure whether they are pregnant sometimes delay seeking antenatal care or abortion services.

FCHVs are selected by the Mothers Group at the village development committee (VDC) level, and each ward within the VDC typically has one FCHV. Criteria for selection include membership in the VDC, literacy, and age between 25 and 45 years, but the actual characteristics of FCHVs vary. A study found that the median age for FCHVs was 38 years and that 4% of FCHVs were over age 60.[11] The study also found that only 62% of FCHVs were literate, but FCHVs were better educated than the general population of rural women of the same age.[11] Literacy levels did not affect the quality of services provided by FCHVs.[11]

Once selected, FCHVs attend an 18-day training on basic maternal and child health information; training on additional topics is conducted as needed. Services provided by FCHVs once they return to their communities include[11]:

- Holding monthly meetings on health issues with the Mothers Group in their villages
- Visiting households to advise on maternal and newborn care and immunizations and to distribute condoms and oral contraceptive pills to existing users
- Iron/folate distribution
- Postpartum vitamin A distribution
- Treatment of children with diarrhea using oral rehydration solution
- First aid
- Community-based pneumonia treatment in some districts

FCHVs are not permitted by law to provide injections or any medical procedure. FCHVs do not receive compensation for their work, but they do get reimbursed for travel expenses when attending trainings and they receive money to purchase tea and snacks for their monthly Mothers Group meetings. FCHVs work, on average, 5.1 hours each week, and annual turnover is low (4%).[11]

Since inception of the program, FCHVs have provided referrals for ANC and family planning services. After liberalization of the abortion law in Nepal, Ipas, an international NGO focused on preventing unsafe abortion, began training FCHVs to refer women for safe abortion services in communities where services were available, initially based on women's suspicion of pregnancy.

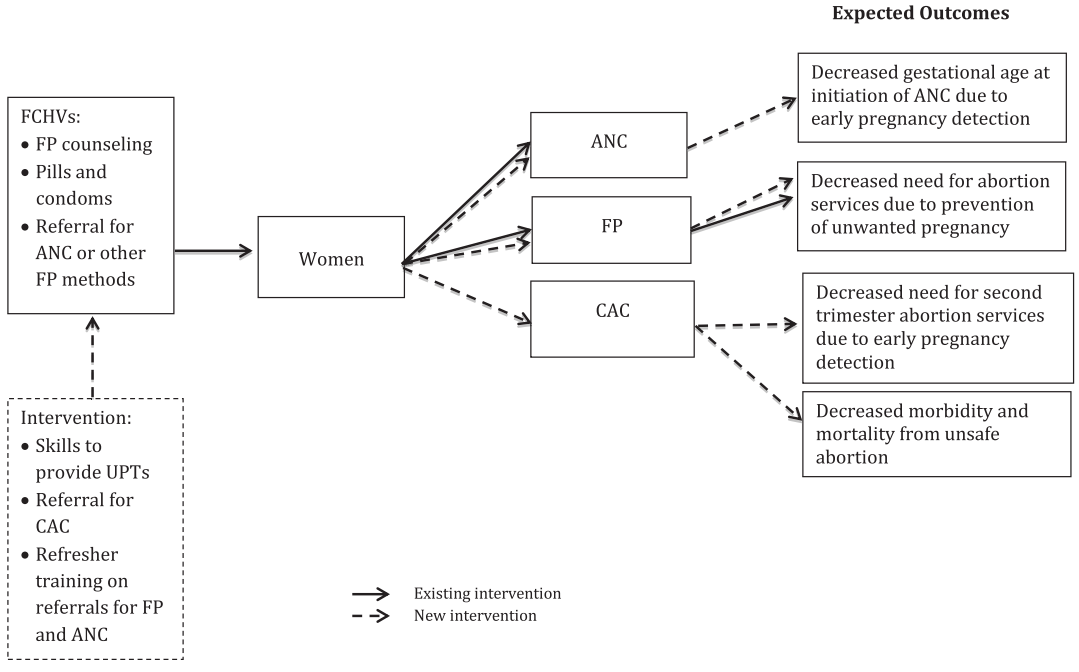
In 2008, Ipas conducted a feasibility study in Bhaktapur District to test the potential of FCHVs to use urine pregnancy testing to link Nepali women to timely reproductive health services. A total of 230 FCHVs were trained to identify early pregnancy using UPTs and to make appropriate referrals to ANC or CAC services for women with positive pregnancy tests and to family planning services for women with negative pregnancy tests. After implementation of this intervention, use of antenatal care, family planning, and safe abortion services improved in the target communities.[12]

Based on this success, Ipas and its partners conducted a similar but larger-scale pilot program covering FCHVs from 6 districts in Nepal (Chitwan, Dhading, Jhapa, Kailali, Surkhet, and Tanahu). The purpose of this paper is to present this innovative approach, which relies on volunteers to link rural women to reproductive health services, and to present initial evaluation results from the 6-district pilot.

INTERVENTION DESCRIPTION

The "Early Pregnancy Detection and Reproductive Health Counseling Program" trained FCHVs on proper use of UPTs and referral for safe abortion and ANC, as well as additional training on family planning, to increase access to reproductive health services through early pregnancy detection at the community level. The focus of the intervention was on training FCHVs to provide UPTs and referral for safe abortion services, if the woman desired, in addition to her typical duties of family planning counseling, provision of condoms and pills to existing users, and referral for ANC or other contraceptive methods, such as sterilization, injectables, and intrauterine devices (IUDs). Early pregnancy detection is hypothesized to decrease the gestational age at which: (a) women with wanted pregnancies initiate ANC and (b) women with unwanted pregnancies seek safe abortion services (Figure 1). In addition, the intervention

FIGURE 1. Conceptual Model for the "Early Pregnancy Detection and Reproductive Health Counseling Program"



Abbreviations: ANC, antenatal care; CAC, comprehensive abortion care; FCHVs, female community health volunteers; FP, family planning; UPT, urine pregnancy test.

supplied FCHVs with knowledge of where to seek safe abortion services, hypothesized to decrease morbidity and mortality associated with unsafe abortion.

In conjunction with the Ministry of Health, Ipas conducted training of trainer (TOT) workshops with medical officers in-charge and providers working at the primary health care center (PHCC), health post, and sub-health post levels. Between January and June 2009, the trainers conducted a series of 2-day workshops for FCHVs at each selected VDC in the 6 districts. Invited FCHVs were from districts where Ipas was also implementing a program to provide medical abortion (MA) as an alternative to surgical abortion methods. All FCHVs working in the catchment area of the facilities providing MA and manual vacuum aspiration (MVA) were trained. One FCHV training was conducted in each VDC, and each training included 9–25 FCHVs, depending on the number working in the area. A total of 1,683 FCHVs were trained.

The training workshops used a variety of interactive methods and formats to promote adult learning, including brainstorming, group discussion, question and answer sessions, mini-lectures, and demonstrations. Topics included:

- How to perform UPTs, practicing on both pregnant and non-pregnant urine specimens
- Informing women in their communities about the availability of UPTs through the existing monthly Mothers Group meetings
- Reinforcement of previous training on contraception and referral for ANC and additional family planning services
- New content on safe abortion, including conditions under which abortion is legal in Nepal, consequences of unsafe abortion, names and locations of certified CAC sites in the FCHVs' districts, and costs associated with CAC services
- Introduction to specially designed information, education, and communication (IEC) materials for use with low-literacy women
- Use of pictorial referral cards designed for use with women with low literacy levels (one section of the referral card included the referral information, which was given to the women, while the FCHVs kept the other section for record-keeping purposes)

On completion of the training, the program provided each FCHV with 15 UPT kits for use in her community; 5 kits were free and the FCHV paid Rs. 10 (US$0.12) per test for the other 10 kits. At the training, the FCHVs agreed that they would charge community members up to Rs. 27 (US$0.32) per test, providing them with a small financial incentive to provide this service. FCHVs charged on a sliding scale depending on what the woman could afford.

The program instructed FCHVs to purchase additional UPT kits as needed through local medicine shops. Most chemist shops outside Kathmandu charge Rs. 50–60 for UPTs. For these replacement UPTs, FCHVs agreed to charge women up to Rs. 50, again on a sliding scale, according to what women could afford.

FCHVs informed women in the community about availability of UPTs primarily through Mothers Group meetings. During the meetings, the FCHVs informed women that if they suspected pregnancy, they could come to the FCHVs for a test. In addition, FCHVs informed women about the availability of UPTs informally when the women sought other information from the FCHVs.

METHODS

Stakeholders from the Family Health Division (Ministry of Health), the FCHV program, Ipas, and the Group for Technical Assistance (GTA)—a Nepalese nonprofit with expertise in community and human resource development—planned the evaluation to assess performance of the trained FCHVs in providing community-based early pregnancy detection and reproductive health counseling and referral services. In addition, we assessed the usefulness of the IEC materials in supporting the FCHVs' reproductive health counseling for women, especially for those seeking CAC services. The Allendale Investigational Review Board reviewed and approved the evaluation protocol and granted a waiver of informed consent as the study presented no more than minimal risk to participants.

Participants

Of the 1,683 trained FCHVs, 1,492 (89%) participated in a 1-day follow-up review meeting conducted at the VDC level to assess their progress and performance. The review meetings took place approximately 8 months after the initial 2-day training sessions (between November 2009 and March 2010). During these meetings, all previously trained FCHVs provided self-reported data using record sheets, and a subset of FCHVs

participated in semi-structured interviews about the IEC materials and their perceived impact of the program. These data were supplemented by interviews conducted with 9 government and NGO reproductive health service providers.

Data Sources and Procedures

FCHV Record Sheets

We developed a structured format to collect information from the FCHVs on:

- Number of pregnancy tests they performed since the training
- Results of the pregnancy tests
- Reasons for not using the pregnancy test kits, if applicable
- Whether the FCHVs provided family planning counseling and/or had distributed condoms or oral contraceptive pills to women in their communities
- Number of women the FCHVs referred for additional family planning services, ANC, and CAC services

The FCHVs maintained records throughout the study period by retaining half of each referral card that they provided to women in their community; they brought these referral cards to the review meeting to help complete the structured data collection tool.

Semi-Structured Interviews With FCHVs

We also designed a semi-structured interview guide to supplement and contextualize the quantitative data from the record sheets. Each review meeting included approximately 9 FCHVs; we randomly selected 3–5 of these FCHVs for an interview to collect information on:

- How the FCHVs were using information from the training in their communities
- How many cases they referred for services since the training and for what types of services
- Their perceptions of community benefits resulting from their training
- The utility of the IEC materials (specifically, whether they used the flip chart in Mothers Group meetings; whether the messages and language used in the flip chart were clear and understandable; and how they used the pregnancy test kit materials, which consisted of a bag, brochure, key ring, and referral card)

Health workers referred 68% of women with positive pregnancy tests for antenatal care and 32% for safe abortion.

Semi-Structured Interviews With Reproductive Health Care Providers

We also collected data from 9 government and NGO service providers on their perceptions of the program's effectiveness, using a semi-structured interview guide. Specifically, we asked providers about their perceptions of the program's effect on FCHV referrals and their thoughts on other ways to increase women's access to reproductive health services.

Analysis

Quantitative data were entered into EpiInfo and checked for consistency. We report descriptive statistics in this paper. We did not collect data from interviews systematically. Some of the interviews were videotaped, transcribed, and translated into English. However, others were not recorded and only had interviewer notes. We reviewed the transcripts and interviewer notes for common themes and selected illustrative quotes.

RESULTS

Community-Based Urine Pregnancy Test Distribution

Of the trained FCHVs with follow-up data, 80% (n=1,199) reported that they performed UPTs during the review period, from May 2009 to March 2010. The FCHVs performed a total of 4,598 UPTs, with a mean of 3.1 tests per FCHV. Two-thirds of FCHVs performed 1 to 5 tests, while 14% performed more than 5 tests (Table 1). FCHVs who did not provide pregnancy tests reported that women did not request a test.

The mean number of UPTs provided per FCHV varied by district. In Jhapa, in the Eastern region, each FCHV provided, on average, 5 UPTs—the highest distribution numbers among all districts (Table 2). In the Central region, FCHVs in Chitwan provided more UPTs (mean=3.9) than in Dhading (mean=2.6). FCHVs from Kailali in the Far Western region and Surkhet in the Mid-Western region performed similarly, providing 2.6 and 2.5 UPTs per FCHV, respectively. FCHVs in Tanahu in the Western region provided the smallest mean number of UPTs (mean=2.1).

Early Pregnancy Detection, Counseling, and Referral

Of the 4,598 pregnancy tests performed by the FCHVs, 53% (n=2,452) were positive and 47%

(n=2,146) were negative for pregnancy. Among women with positive pregnancy tests, FCHVs referred over two-thirds (68%) of them for ANC and about one-third (32%) for safe abortion services (Figure 2).

All women with negative pregnancy tests received family planning counseling. The most common family planning service provided by FCHVs was counseling only (46%), but 24% of women received oral contraceptive pills, 20% received condoms, and 10% were referred for other methods, such as injectables, IUDs, contraceptive implants, or sterilization (Figure 3).

Perceptions of FCHVs and Other Service Providers

Benefits of Community-Level UPTs

FCHVs who were interviewed reported a number of positive aspects of providing UPTs at the village level:

- Tests were simple to perform, they were reliable, and the results were immediately available.
- Women in the community appreciated the low cost and local availability of the tests.
- FCHVs thought the availability of community-based early pregnancy detection increased women's privacy.
- Having pregnancy test results, combined with improved knowledge of reproductive health services from the training, enhanced their ability to provide appropriate counseling and referrals for reproductive health services.
- Women in their communities felt that early pregnancy detection and referral allowed them to make informed reproductive health decisions.

A district-level nurse discussed the value of supplying UPTs at the community level at low cost.

> *FCHVs perform the tests at Rs 30, whereas in district hospital they cost Rs 100. So due to this differential, the number of clients coming to hospitals for the urine pregnancy tests are decreasing nowadays.*
>
> —Nurse, District Public Health Office, Dhading

Other service providers noted an increase in FCHV referrals for ANC, family planning, and comprehensive abortion care across a variety of service sites, including public, private, and NGO clinics; hospitals; and primary health care centers.

TABLE 1. Distribution of UPTs Performed per FCHV

No. of UPTs	Frequency (No. of FCHVs)	Percent Frequency
0	293	20%
1	231	15%
2	253	17%
3	204	14%
4	149	10%
5	145	10%
> 5	217	14%
Total	**1492**	**100%**

Abbreviations: FCHV, female community health volunteer; UPTs, urine pregnancy tests.

> *50% of the women who come for [abortion] service are referred by FCHVs.*
>
> —Health service provider, Hospital, Tanahu

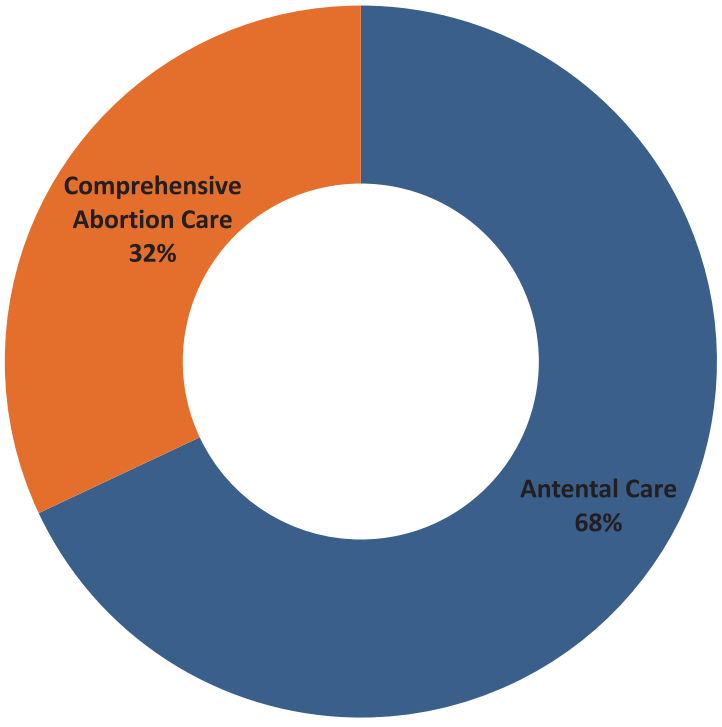
> *This has benefited a lot. At our centre, ANC cases are increasing. Before their [FCHVs] orientation, we use[d] to have 30–35 cases [per month] only, occasionally reaching [up] to 40–60. Nowadays, we are doing 100–150 ANC check-ups in a month. On average, 1–2 [abortion] cases are referred in a month by FCHVs.*
>
> —Health service provider, Primary Health Care Center, Dhading

TABLE 2. Mean Number of UPTs Performed per FCHV by District

District	No. of FCHVs	Mean No. of UPTs per FCHV
Jhapa	184	5.0
Chitwan	247	3.9
Dhading	107	2.6
Kailali	533	2.6
Surkhet	341	2.5
Tanahu	80	2.1
All Districts	**1492**	**3.1**

Abbreviations: FCHV, female community health volunteer; UPTs, urine pregnancy tests.

FIGURE 2. Referrals Provided to Women With Positive Pregnancy Tests (n=2,452)



Usefulness of IEC Materials

FCHVs reported using the pictorial IEC flip charts with women both one-on-one and in group settings, such as during Mothers Group meetings. The FCHVs found the flip charts to be an effective tool for educating women, particularly women who were uninformed about safe abortion services.

DISCUSSION

This study found that trained FCHVs were interested and successful in providing low-cost UPTs in their communities, and pregnancy status information improved their ability to counsel and refer women for appropriate reproductive health services, including antenatal care, family planning, and comprehensive abortion care.

Among women with negative pregnancy tests, family planning counseling alone was the most common service provided (46%). More research is needed to understand why nearly half of women suspecting pregnancy but having negative pregnancy tests did not receive family planning methods or referral for methods. One possible explanation is that at least some of these women wanted to become pregnant (the record sheets did not collect information about reproductive intentions). However, it is also possible that FCHVs provided counseling alone when they did not have an adequate supply of family planning methods to distribute, or if women refused contraceptives due to fear of side effects or other health concerns.

Among women with positive pregnancy tests, FCHVs referred 68% of them for ANC and 32% for safe abortion services. Among the women referred for abortion, we do not know the proportion who actually sought CAC services. When women arrive at a certified CAC facility seeking abortion services, they receive additional counseling on options including ANC or surgical or medical abortion. After their procedures, women also receive counseling on family planning with a focus on long-acting reversible contraceptive methods. Overall, the sizable proportion of women referred for abortion services suggests that unwanted pregnancy is common, and FCHVs should focus on counseling women in their communities about family planning and providing contraceptives, including referral for long-acting and permanent methods, to prevent unwanted pregnancy.

Mobilizing a large number of FCHVs with the materials, supplies, and skills required for early pregnancy detection, reproductive health counseling, and referral seems to be a promising approach to improving access to reproductive health services at the community level in Nepal. FCHVs who were interviewed reported that women in their communities appreciated the low cost, local availability, and privacy afforded by community-based early pregnancy detection services. This evaluation was not able to link use of UPTs and referrals for services with an actual increase in uptake of services. However, we hypothesize that if FCHVs have information about available services, IEC tools to share that information, and UPTs to identify pregnancy early, and if FCHVs are providing UPTs and referring women for services, then women will have the information they need to access timely reproductive health services.

The majority of FCHVs (80%) provided UPTs. However, a sizable 20% did not provide tests

during the 8-month follow-up period, primarily because they said that women did not request tests. Although it is possible that women in some communities were not interested in using UPTs, it is more likely that this finding reflects the involvement of the FCHV in her community and the proximity of the community to a health center. In communities close to a health center, women may go directly to the facility when they suspect pregnancy rather than accessing these services through the FCHV.

Program Challenges and Lessons Learned

Program implementation challenges need to be addressed to realize the full potential of the FCHV approach, particularly related to training, resupply of UPTs, and referral.

Training

Training was conducted at the VDC level, but some FCHVs were unable to attend the training due to other responsibilities such as household work, personal issues, other training events, or commitment to planned Mothers Group activities. Since only 1 training was held in each VDC, FCHVs who were not available that day were not trained.

It was also difficult to secure training facilities and coordinate dates for the workshops due to concurrent programs hosted by district health offices. Trainers also noted delays and omissions in communicating training information and schedules to FCHVs, particularly at the VDC level. To improve communication, the TOT workshops were expanded to include providers at the sub-health posts, which improved coordination at the VDC level.

This pilot focused on training FCHVs working in the catchment areas for sites providing safe abortion services, which accounted for 43% of the FCHVs in these districts. Based on the findings from this pilot, training has been expanded to cover all FCHVs working in these 6 districts. As of January 2013, the program has been implemented in 19 of the 75 districts in Nepal, and Ipas intends to continue working in coordination with the Ministry of Health to scale up this program to other districts.

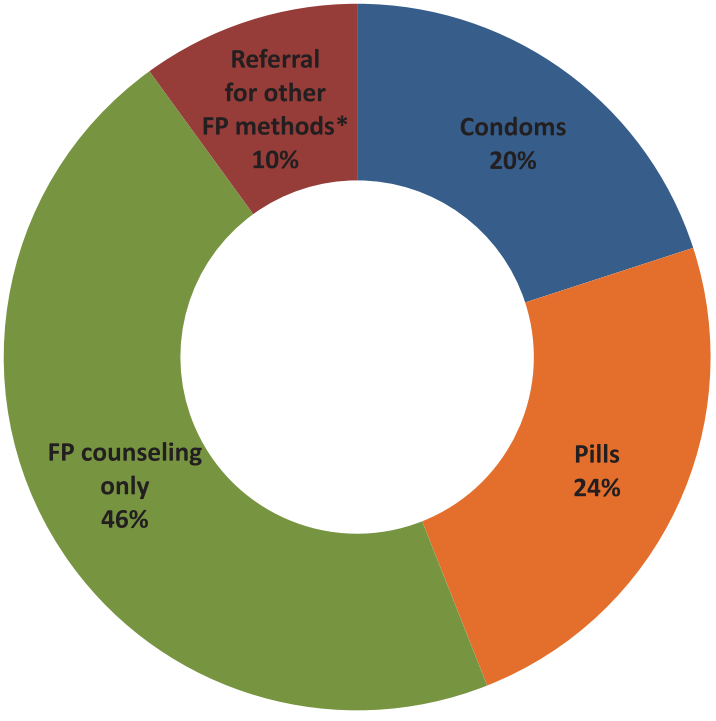
Resupply of UPTs

As discussed in the intervention description, FCHVs were asked to resupply their pregnancy test kits through local medical shops. However, this did not work well due to stockouts and to the high cost of UPTs in these shops (Rs. 50–60) when FCHVs only charged up to Rs. 50 for the resupplied kits.

For this program to be sustainable, a reliable and affordable mechanism had to be developed to resupply pregnancy test kits. Based on lessons learned during the pilot, the program contracted a distributor in Kathmandu to provide FCHVs with UPTs for Rs. 11 per test. Currently, the distributor is supplying UPTs to public health nurses at the district level, and the health post in-charges obtain their VDC's supply of UPTs from the public health nurse when they travel to the district-level health facility for their monthly meeting. The health post in-charges then provide the UPTs to the FCHVs at the VDC level. FCHVs

Reliable and affordable sources to resupply health workers with pregnancy tests need to be available to sustain the approach.

FIGURE 3. Services Provided to Women With Negative Pregnancy Tests (n=2,146)



Abbreviations: FP, family planning.

* For injectables, IUDs, implants, or sterilization.

are able to purchase the UPTs when they resupply their family planning commodities at the VDC level, which seems to be working well.

Referral

The referral card system had limited success. The FCHVs found the cards difficult to understand and to complete. Instead of providing referral cards, some of the FCHVs accompanied women to their health care provider appointments.

Based on these challenges, the program no longer uses referral cards to measure FCHV service provision. Instead, FCHVs are currently self-reporting the number of referrals they make for ANC, family planning, and safe abortion services through their monthly meetings with the medical officers in-charge. Indicators on referral for abortion services have been built into the broader health management information system (HMIS) that already monitored ANC and family planning services provided by FCHVs.

Health workers reported that early pregnancy detection empowered women to make timely reproductive health decisions.

Frequent staff turnover and transfer of service providers also adversely affected the referral component of the program, which necessarily depends on the availability of reproductive health services.

Study Limitations

The findings of this study should be viewed in light of several limitations. Around 11% of the FCHVs who were trained missed the 8-month review meeting where the assessments for this evaluation took place. The results presented here may be an overestimation of the success of the program if the FCHVs who did not attend the review meeting were less likely to implement the intervention than those who did attend.

In addition, the number of referral cards each FCHV brought to the review meeting may not have represented the true number of women served. Many FCHVs reported that they did not always provide a referral card when women came to them for help due to the informal nature of the visits and the difficulty associated with filling out the cards. Some FCHVs forgot to bring their cards to the review meeting, and instead provided an estimate for the number of women served.

Furthermore, no data were collected on the care that women received once they arrived at the referral facility. As a result, we do not know how many women who were referred actually attended a facility. We also do not know whether the result of the pregnancy test was accepted by the provider at the facility or whether women were retested. However, the purpose of this intervention was to provide women with the information they need to make timely reproductive health decisions; it was not intended to replace the care provided in health facilities.

Additionally, this study relies on data self-reported by the FCHVs, which are subject to recall and social desirability biases. Social desirability bias is of particular concern for the data from interviews about the IEC materials, as the FCHVs may have felt compelled to give positive feedback. In addition, data from the interviews were not collected systematically and may not be representative of the participants' views.

Finally, 3 of the districts included in this study were classified as hilly and 3 as flat. Including one of Nepal's mountainous districts would have provided more information relevant for scale up across all of Nepal's 75 districts.

CONCLUSIONS

The results of this evaluation suggest that community health workers such as FCHVs are a promising channel for early pregnancy detection and referral to reproductive health services in low-resource settings. After a 2-day training on use of UPTs and referral for ANC, safe abortion, and family planning services, FCHVs provided UPTs to women in their communities and used the results of the pregnancy tests to refer women to appropriate services. FCHVs welcomed this addition to their existing menu of services, and they reported that providing this service made women feel empowered to make informed reproductive health decisions.

Further research is needed to understand the full potential of this approach to improve access to reproductive health services at the community level. More rigorous evaluations are needed that link the use of UPTs and FCHV referrals with actual service delivery. Ideally, future studies would use an experimental design to compare changes in the proportion of services provided based on FCHV referrals in intervention districts compared with control districts with FCHVs who have not received this training. Key outcomes to assess would be the gestational age upon initiation of ANC and upon seeking safe abortion services.

Acknowledgments: The early pregnancy detection and referral project, including this evaluation, was funded as part of the ongoing Ipas program in Nepal.

Competing Interests: None declared.

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Peer Reviewed

Received: 2012 Aug 27; **Accepted:** 2013 Apr 9; **First Published Online:** 2013 Sep 16

Cite this article as: Andersen K, Singh A, Shrestha MK, Shah M, Pearson E, Hessini L. Early pregnancy detection by female community health volunteers in Nepal facilitated referral for appropriate reproductive health services. Glob Health Sci Pract. 2013;1(3):372-381. http://dx.doi.org/10.9745/GHSP-D-12-00026

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ORIGINAL ARTICLE

Does free pregnancy testing reduce service denial in family planning clinics? A cluster-randomized experiment in Zambia and Ghana

John Stanback,[a] Gwyneth Vance,[a] Gloria Asare,[b] Prisca Kasonde,[c] Beatrice Kafulubiti,[d] Mario Chen,[a] Barbara Janowitz[a]

Pregnancy tests, which cost very little (~US$0.10) and are often required for successful family planning service delivery, may reduce service denial, and should be available in all family planning clinics at no or minimal cost to clients.

ABSTRACT

Background: In many countries, pregnancy tests are not freely available in family planning clinics. As a result, providers sometimes deny services to non-menstruating clients due to uncertainty about pregnancy. Few clients are actually pregnant, yet denied clients run the risk of becoming pregnant, and those sent to pharmacies pay inflated prices for inexpensive tests. To assess the programmatic effect of free pregnancy testing, we conducted cluster-randomized trials in Ghana and Zambia, assessing clients' uptake of contraception in family planning clinics.

Methods: In each country, 5 clinics were randomized to intervention status and 5 to control. Service data from 2,028 new, non-menstruating clients in Zambia and 1,556 in Ghana were collected. Intervention clinics received supplies of pregnancy tests, and staff were instructed to use tests as needed to help exclude pregnancy. Control clinics received no intervention. The primary outcome was the proportion of non-menstruating clients denied an effective contraceptive method. Cost-effectiveness was also evaluated.

Results: In Zambia, clients in intervention and control clinics faced a similar risk of service denial at baseline, 15% and 17%, respectively. At follow-up, denial remained unchanged at 17% in control clinics, but decreased significantly to 4% in intervention sites. Clients in Zambia were 4.4 (95% confidence interval [CI]=1.3–14.4) times more likely to be denied a method in control sites versus intervention sites ($P<.01$). Results from Ghana were inconclusive. Cost of a ''denial averted'' in Zambia was estimated to be US$0.59.

Interpretation: Zambia results suggest that availability of free pregnancy testing significantly reduced contraceptive service denial, although results from Ghana preclude an unqualified recommendation. Authors conclude that free pregnancy testing in family planning clinics may make strong public health sense in those developing countries where denial to non-menstruating clients remains a problem. Although pregnancy can usually be excluded with a client history, pregnancy tests are often necessary.

BACKGROUND

Family planning providers in many developing countries still deny services to some non-menstruating clients due to uncertainty about pregnancy status.[1,2] Such clients are sent away, either home to await menses or forced to go to a pharmacy to buy a pregnancy test. Resources are wasted as clients—very few of whom are pregnant[3,4]—pay for expensive, often unnecessary tests and make multiple clinic visits. Clients sent home to await menses also run the risk of becoming pregnant in the interim. The scope of this problem is unknown, and there is some evidence it may be decreasing. Older studies in Kenya suggested that nearly half of non-menstruating clients were

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denied immediate services,[5] while more recent research has suggested proportions ranging from 17% to 35%.[6] Still, the pool of those at risk is undoubtedly large; in many countries, nearly half of new family planning clients present for services during postpartum amenorrhea or between menstrual periods.[6]

Checklists Not a Cure-All

In response to this problem, a job aid called the ''pregnancy checklist'' was developed to help family planning providers exclude pregnancy with a reasonable degree of certainty (Figure 1).[3] Although this job aid—essentially a client history-taking tool—has been shown to improve access to services when used correctly,[6] its introduction has not been a cure-all. Even when providers do take full advantage of the pregnancy checklist, it cannot exclude pregnancy for a sizable minority of new family planning clients who do not meet any one of its 6 criteria—such as sexual abstinence since last menstrual period—that rule out pregnancy.

The Use of Pregnancy Tests

In wealthy countries, pregnancy tests are commonly used in family planning clinics and supplement, or substitute for, the client history on which the pregnancy checklist is based. In poorer countries, pregnancy tests may be perceived as too expensive for routine use for family planning. When health centers do stock limited numbers of test kits, our experience is that they are often reserved for antenatal care, although, in some countries, even those clients are forced to purchase tests from retail outlets.[7]

However, the price of highly accurate pregnancy tests has decreased significantly in recent years, and programs can now purchase simple paper strip tests for less than US$0.10,[8] a price which may make free clinic-based testing cost-effective. Yet in spite of the low price of tests and the fact that the pregnancy checklist is ineffective in some situations, few poor countries have made free or inexpensive pregnancy testing a routine adjunct to family planning services, and the impact of providing free tests is unknown. To assess the programmatic effect of free pregnancy testing, we conducted cluster-randomized trials in Ghana and Zambia, assessing clients' immediate uptake of effective contraceptive methods in government family planning clinics. A cluster design was used because it was impracticable to randomize clients individually.

Resources are wasted as non-menstruating clients—few of whom are pregnant—are denied family planning services, required to pay for expensive tests, or make multiple clinic visits.

METHODS

Study Design and Population

The experiment was conducted in 2009–2010 as a sub-study ''piggy-backed'' onto a larger study being conducted in the Central Region of Ghana and in Central Province, Zambia. Both areas are largely rural, and are marked by poverty, high fertility, and low use of modern contraceptives. Before study initiation, the protocol received ethical approval from the Ghana Health Service Ethical Review Committee, the ERES Converge Institutional Review Board (IRB) in Zambia, and the Protection of Human Subjects Committee of FHI 360 in North Carolina, USA.

We hypothesized that free availability of pregnancy testing would reduce service denial rates in government family planning clinics. To calculate the required sample size, we used a z-approximation for comparisons of change from baseline between the groups using a logistic model with adjustments for clustering effects.[9] Sample size calculations were based on estimates of the proportion of women denied effective contraceptive methods, the expected change in this level, as well the intraclass correlation coefficient (ICC)—a measure that quantifies the extent to which services to clients *within* a clinic are more similar to one another than services between different clinics—among study clusters (facilities) and time points. The expected change in denial was based on findings from a previous study[6] in which the pregnancy checklist job aid was introduced in family planning clinics to reduce the proportion of women leaving without a method. We assumed a decrease in denial of 14% (for example, from 16% to 2%) in the intervention group beyond any changes in the control group. The ICC among family planning clinics in this same study for the stated outcome was low, ranging from 0.018 to 0.056 for the different countries in the study. For computations we assumed an ICC of 5%. The correlation pretest-posttest was assumed to be no smaller than 1.25%.

A cluster-randomized experiment assessed the programmatic effect of free pregnancy testing in family planning clinics in rural areas of Ghana and Zambia.

Baseline Data Collection

With these assumptions, contraceptive uptake information was needed in each country from a minimum of 100 new and re-starting family planning clients in each of 10 clinics to have a power of 83% to detect a significant difference

FIGURE 1. Pregnancy Checklist

How to be Reasonably Sure a Client is Not Pregnant

Ask the client questions 1–6. As soon as the client answers **YES** to ***any question,*** stop, and follow the instructions.

NO	1. Did you have a baby less than 6 months ago, are you fully or nearly-fully breastfeeding, and have you had no menstrual period since then?	YES
NO	2. Have you abstained from sexual intercourse since your last menstrual period or delivery?	YES
NO	3. Have you had a baby in the last 4 weeks?	YES
NO	4. Did your last menstrual period start within the past 7 days (or within the past 12 days if you are planning to use an IUD)?	YES
NO	5. Have you had a miscarriage or abortion in the past 7 days (or within the past 12 days if you are planning to use an IUD)?	YES
NO	6. Have you been using a reliable contraceptive method consistently and correctly?	YES

If the client answered **NO** to ***all of the questions,*** pregnancy cannot be ruled out. The client should await menses or use a pregnancy test.

If the client answered **YES** to ***at least one of the questions*** and she is free of signs or symptoms of pregnancy, provide client with desired method.

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between the arms with a one-sided test (that is, greater decrease in the intervention group) at a 5% significance level. For this paper, analysis was limited to non-menstruating women, so the effective sample size and power would be lower under the same assumptions.

In both Ghana and Zambia, Ministry of Health officials provided a list of representative health centers in target districts. Microsoft Excel's random number generator was used to allocate 5 clinics from each country's list to receive an ample supply of free pregnancy tests and 5 clinics to serve as controls. Prior to making the tests available in the intervention clinics, baseline data were collected for approximately 3 months in all clinics from new and restarting clients seeking family planning services. During data collection, family planning providers used a simple log to anonymously record the following information about each client: date of service, method received, menstrual status, how pregnancy was excluded, and, if no method was received, the reason why not. Client menstrual status was recorded as currently menstruating, postpartum amenorrhea, or intermenstrual (between two normal menstrual periods).

Intervention Phase

After baseline data collection was completed, the intervention phase of the study began. Providers in the clinics randomly allocated to receive pregnancy tests were shown how to properly use the tests and instructed to use them as needed to help rule out pregnancy among their family planning clients. Control clinics received no specific instructions about ruling out pregnancy among their family planning clients. Using a client history to exclude pregnancy is a recommended practice in both countries, and providers may have been exposed in the past to the pregnancy checklist. (The job aid was seen in some of the study clinics.) However, we purposefully did not include the checklist in the intervention or instruct providers in how to use pregnancy tests in conjunction with the pregnancy checklist, preferring rather to isolate the effect of the availability of free pregnancy testing when compared with standard care. We did not measure the checklist's use beyond asking providers to note in the log what means were used to rule out pregnancy.

Immediately after the pregnancy tests were provided to the intervention clinics, 3 months of follow-up data collection began in all 10 clinics in each country, using the same data collection log sheets. To analyze the data, SAS 9.2 was used to compare changes from baseline between the 2 study groups. A logistic mixed model was used to account for clustering at the facility level, and intermenstrual status was included as a covariate. Intervention effects, therefore, were evaluated using a comparison of odds ratios for changes between pre- and post-test between the 2 groups as estimated with the model. A separate model was fitted for each country.

The number of tests used in each clinic was tracked to produce an estimate of the incremental cost of reducing service denial, in other words, the cost per denial averted.

RESULTS

Client Characteristics

Overall, 44% of new clients (similar proportions in each country) were not menstruating when they presented for services (Table). These women are at particular risk of service denial due to uncertainty about their pregnancy status. Among the non-menstruating clients, those in Zambia were equally divided between those with postpartum/lactational amenorrhea and those between menstrual periods. In Ghana, nearly two-thirds (63%) of non-menstruating clients were amenorrheic. (The pretest sample size in Ghana was lower than anticipated due to a national strike during this period.) Although data quality was generally very good, client-specific data on *how* providers excluded pregnancy were incomplete and thus were not included in this analysis.

Service Denial Outcomes

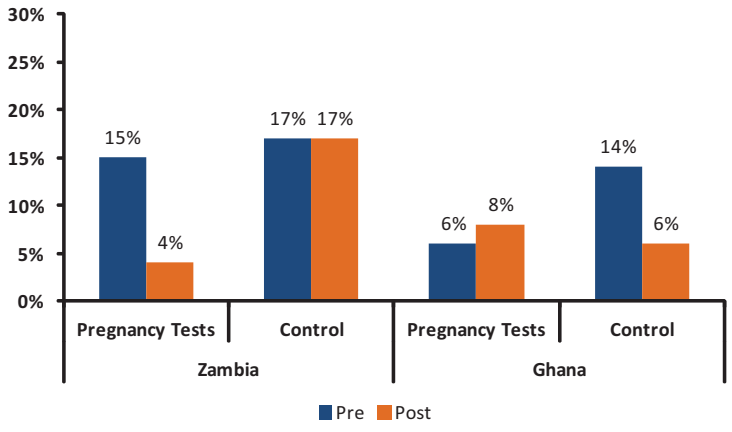
The primary outcome assessed was the denial of an effective contraceptive method to non-menstruating family planning clients (Figure 2). In Zambia, clients in both intervention and control clinics faced a similar risk of service denial at baseline, 15% and 17% respectively. At follow-up, service denial remained unchanged at 17% in the five control clinics, but decreased significantly to only 4% in intervention sites. Our model (not shown), which accounted for clustering at the clinic level and adjusted for intermenstrual status, estimated that clients in Zambia were 4.4 (95% confidence interval [CI]=1.3–14.4) times more likely to be denied a family planning method in control sites as compared with intervention sites where free pregnancy tests

Clients in Zambia were 4.4 times more likely to be denied a family planning method in control sites as compared with intervention sites where free pregnancy tests had been introduced.

TABLE. Family Planning Client Menstrual Status, by Study Group

	Intervention Group (free pregnancy tests)		Control Group (standard care)	
Zambia	**Pre (n=439)**	**Post (n=362)**	**Pre (n=693)**	**Post (n=534)**
Menstruating	52%	54%	42%	58%
Between menses	19%	19%	36%	26%
Amenorrheic	29%	27%	22%	16%
Ghana	**Pre (n=239)**	**Post (n=423)**	**Pre (n=283)**	**Post (n=611)**
Menstruating	53%	47%	46%	48%
Between menses	31%	20%	24%	15%
Amenorrheic	16%	33%	30%	37%

FIGURE 2. Denial of Contraceptives to Non-Menstruating Family Planning Clients



had been introduced, with a one-sided *P* value of <.01. This comparison accounts for baseline levels.

The results from Ghana were less clear. At baseline, risk of denial was dissimilar in the 2 clinic groups (6% in intervention sites and 14% in controls). Subsequently, denial rates remained stable in intervention clinics (8%), but decreased to 6% in *control* clinics (*P*=.85).

Cost per "Denial Averted"

Providers used 117 pregnancy tests in the intervention clinics in Zambia and 200 tests in Ghana. We divided the total costs of tests used (US$0.09 per test) in the post-intervention period by the estimated number of clients who, in the absence of free pregnancy testing, would have been denied services. Based on the differences in the pre- and post-intervention levels of denials, we calculated that, in Zambia, 18 clients would have been denied services but were not, due to the availability of testing. Given the costs of tests used during that period, the estimated cost of a "denial averted" in Zambia was only US$0.59. Although the intervention did not appear to prevent denials in Ghana, we pooled the cost of tests from both countries and found that, study-wide, the estimated cost of a denial averted was US$1.59.

DISCUSSION

Reduced Service Denial

Taken alone, the results from Zambia suggest that the availability of free pregnancy testing significantly reduced contraceptive service denial in government clinics in that country. After discussions with the Ghana country research team, we still have no full explanation for the results in Ghana, in which no change was seen in the intervention sites, but denial rates appeared to have dropped in *control* clinics during the time of the study. We feel that the most likely explanation is that service denial in Ghana is low, on the order of 6%–8%, and cannot, therefore, decrease substantially. We speculate that the relatively high level of denial (14%) seen in the control group during the pre-test phase was an aberration, perhaps related to the national health workers' strike occurring at that time, which simply reverted to a more normal level during the post-test period.

A Public Health Rationale

While the inconclusive results from Ghana preclude an unqualified recommendation, results from Zambia suggest that availability of free or low-priced pregnancy tests in family planning clinics may make strong public health sense in developing countries where service denial to non-menstruating clients remains a problem. Pregnancy test strips cost very little and fill an obvious gap when a client history fails to exclude pregnancy. When testing is indicated (for example, when the pregnancy checklist fails to rule out pregnancy in a woman with amenorrhea), women in such settings may be unable to afford these products from private pharmacies, where similar tests retail for between US$1 and $3 (a mark-up of greater than 1,000%). In rural areas, pharmacies and drug retailers that sell pregnancy tests are often nonexistent.

Low Costs

What prevents clinics from offering free or inexpensive pregnancy testing now? Currently, programs in the poorest developing countries do not usually include pregnancy tests in the ''basket'' of contraceptive commodities provided to clinics, and adding a new product is as much a logistic headache as a financial one. Of course, commodity costs are only part of the final cost of providing such a product at scale, and yet given the very low cost of pregnancy tests—in this study, the commodity cost for 3 months' worth of tests for 5 clinics was only about US$10—and their potential role in improving women's access to family planning, a strong case can be made for routine procurement of tests similar to that of other complementary products, such as latex gloves and sharps containers.

A Compatible Tool

If pregnancy tests do become more widely available in family planning programs in developing countries, a strong role should remain for the simple, low-tech pregnancy checklist to help providers rule out pregnancy. Neither histories nor pregnancy tests are perfect screening tools; ''false negatives'' can occur when pregnancy tests miss early pregnancies, and, more commonly, ''false positives'' occur (with published frequency ranging from 12%[3] to 39%[4]) when the pregnancy checklist fails to exclude pregnancy in non-pregnant women.[1] But since no known risk occurs to either a mother or an undetected fetus from exposure to contraceptive hormones, the benefits of increased client contraceptive access should take precedence over excessive caution in excluding pregnancy, particularly in countries with high maternal mortality and morbidity rates. Every effort should be made to provide effective contraception on the same day that a woman presents for contraceptive services.

The availability of free or low-priced pregnancy tests may make strong public health sense where service denial to non-menstruating clients remains a problem.

Every effort should be made to provide effective contraception on the same day that a woman presents for contraceptive services.

Added Benefits

Wider availability of pregnancy tests could have other benefits as well. Free or nominally priced testing could encourage women to enter the health system to know their pregnancy status. If pregnant, they could get a timely referral for antenatal care[7] or, where legal and if the women desire, pregnancy termination. For non-pregnant women, testing could serve as a ''teachable moment'' to offer family planning services. Pregnancy tests are also useful to exclude pregnancy in the common situation when women present more than one month late for DMPA re-injection[10] or to provide reassurance in cases where women using progestin-only methods, such as contraceptive implants, worry that they are pregnant when they experience the normal side effect of amenorrhea.

The pregnancy test and the checklist are complementary tools and should be used in a way that optimizes successful service delivery.

Training Remains Important

Family planning providers in developing countries should be trained to know when to use a

client history or a pregnancy test—or both—to exclude pregnancy. The 2 tools are complementary and should be used in a way that optimizes successful service delivery. For example, if a woman is amenorrheic (such as during the postpartum period or after discontinuation of progestin-only injectable), the preferable hierarchy is that the pregnancy checklist should be used first, since tests, although cheap, are not free. If the checklist fails to rule out pregnancy, then a pregnancy test should be used. On the other hand, if a woman presents between 2 normal menstrual periods, a pregnancy test is not useful. If a woman has already missed her menstrual period, a pregnancy test should be used to rule out or confirm pregnancy. In retrospect, we realize that one limitation of the study was that the design used did not better reflect the complementarity between pregnancy tests and the pregnancy checklist. Ideally, a 3-arm or factorial design should have been used.

Next Steps

If family planning programs decide to incorporate free pregnancy testing, a key next step would be to address procurement considerations, such as supply chain logistics, so that pregnancy tests are reliably delivered to clinics along with other supplies. Meanwhile, training for family planning providers should include appropriate use of both methods to exclude pregnancy, emphasizing the provider-client trust required for appropriate use of the pregnancy checklist. Additional research on reasons for service denial by providers would also be useful, given that entities such as the U.S. Agency for International Development (USAID) and the World Health Organization have been working for years to eliminate this medical barrier.

Acknowledgments: The authors are grateful for funding from USAID. We also thank Bertha Boakye-Agyeman, Justice Hafoba, Sydney Kaweme, Sara Bates, Brooke Boyer, and Laura Johnson, as well as the family planning clients and providers who participated in this research.

Competing Interests: None declared.

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Peer Reviewed

Received: 2013 Feb 5; **Accepted:** 2013 Aug 16; **First Published Online:** 2013 Sep 24

Cite this article as: Stanback J, Vance G, Asare G, Kasonde P, Kafulubiti B, Chen M, et al. Does free pregnancy testing reduce service denial in family planning clinics? A cluster-randomized experiment in Zambia and Ghana. Glob Health Sci Pract. 2013;1(3):382-388. http://dx.doi.org/10.9745/GHSP-D-13-00011

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ORIGINAL ARTICLE

Child malnutrition in Haiti: progress despite disasters

Mohamed Ag Ayoya,[a] Rebecca Heidkamp,[b] Ismael Ngnie–Teta,[a] Joseline Marhone Pierre,[c] Rebecca J Stoltzfus[d]

Despite a devastating earthquake and a major cholera outbreak in Haiti in 2010, surveys in 2006 and 2012 document marked reductions in child undernutrition. Intensive relief efforts in nutrition as well as synergies and improvements in various sectors before and after the earthquake were likely contributing factors.

ABSTRACT

Undernutrition, a chief child killer in developing countries, has been a major public health problem in Haiti. Following the 2010 disasters (earthquake and cholera) and the intensive relief efforts to address them, we sought to determine the trends of child undernutrition in Haiti using data from the 2005–06 Haiti Demographic and Health Survey (HDHS) and from a Standardized Monitoring and Assessment of Relief and Transitions (SMART) survey in 2012. Growth data analyses included 2,463 (HDHS) and 4,727 (SMART) children ages 0–59 months. We calculated the prevalence of stunting, wasting, and underweight for each survey using World Health Organization 2006 growth standards. To account for sampling design, probability weights were applied to all analyses. Statistical significance was determined by non-overlapping confidence intervals around estimates. Stunting prevalence declined from 28.5% (95% confidence interval [CI]=25.9, 31.3) in 2005-06 to 22.2% (95% CI=20.2, 24.3) in 2012; wasting, from 10.1% (95% CI=8.2, 12.7) to 4.3% (95% CI=3.6, 5.2); and underweight, from 17.7 % (95% CI=15.6, 20.1) to 10.5% (95% CI=9.3, 11.9). Additionally, stunting declined more in rural areas, from 33.6% (95% CI=30.1, 37.2) in 2005–06 to 25% (95% CI=23.4, 26.7) in 2012, than in urban areas, from 18.6% (95% CI=15.3, 22.5) in 2005–06 to 18.4% (95% CI=16.7, 20.1) in 2012, for reasons that remain unknown. Results of the 2012 HDHS confirmed the observed trends. Thus, undernutrition among Haitian children under 5 declined significantly between 2005–06 and 2012. Our results should be interpreted in view of investments and changes that occurred in different sectors (within and outside health and nutrition) before and after the earthquake.

INTRODUCTION

Globally, an estimated 165 million children under age 5 are stunted, and at least 52 million are wasted.[1] Undernutrition accounts for 45% of all deaths among children under 5 years of age.[1] Haiti has the highest rates of childhood underweight and wasting in the Latin America and Caribbean region.[2] The Global Burden of Disease Study 2010 highlighted Haiti also for its high burden of disease and injury and high mortality and for having the world's lowest healthy life expectancy.[3]

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Child undernutrition has long been a major public health problem and silent emergency in Haiti. The fourth national Haiti Demographic and Health Survey (HDHS 4), conducted in 2005–06, found that 1 in every 3 children under age 5 was stunted, 1 in every 10 was wasted, and 2 in every 10 were underweight. Stunting rates in this age group were almost twice as high in rural areas as in urban areas.[4] The latest HDHS, in 2012, reported lower rates of undernutrition among under-5s: 21.9% stunted, 5.1% wasted, and 11.4% underweight.[5]

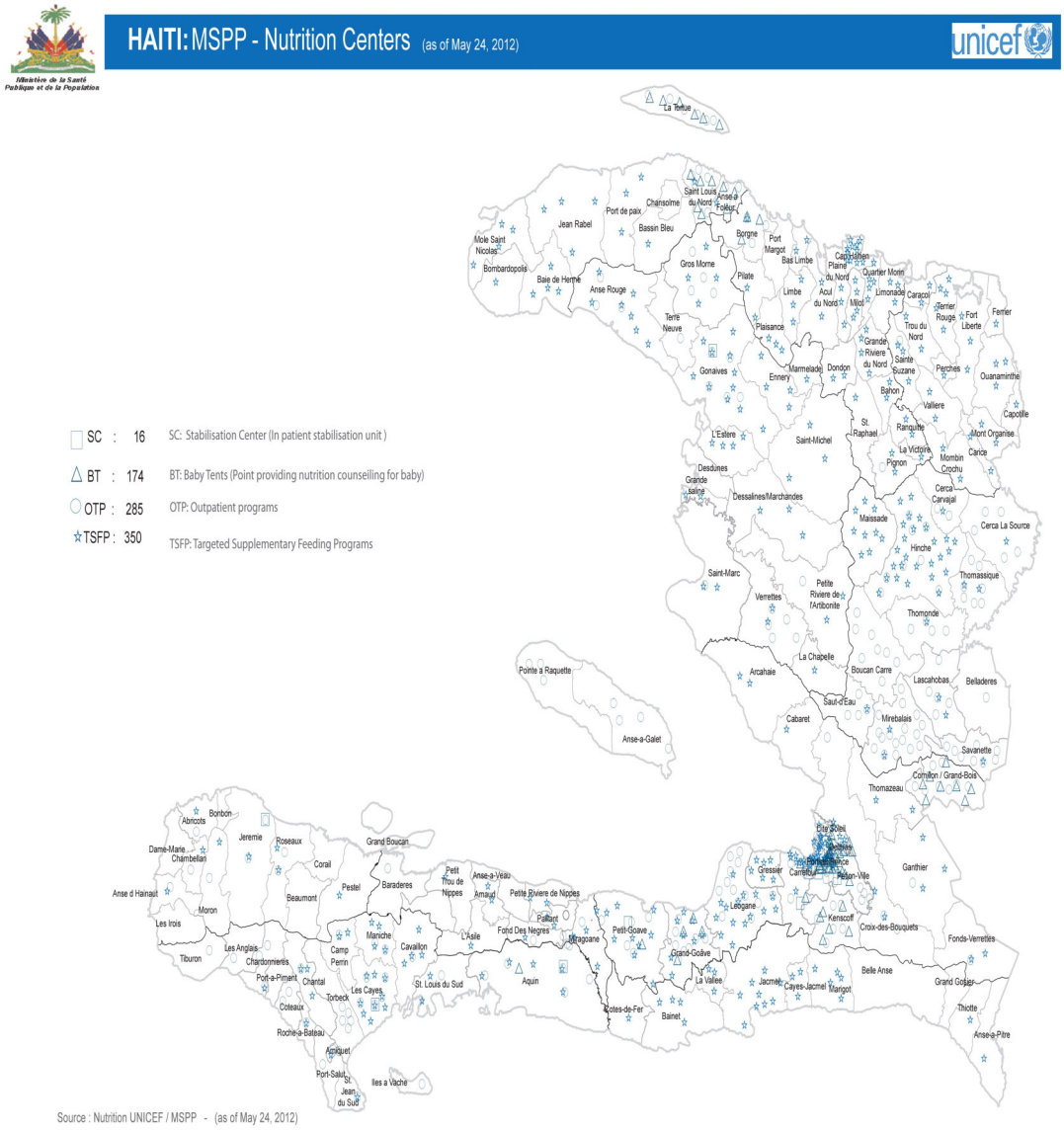
The 2010 Earthquake: The Trigger of a New Era for Nutrition in Haiti

The January 2010 earthquake in Haiti caused unprecedented loss in human life and physical infrastructure. It also displaced at least 1.5 million people, putting more children at high risk of undernutrition.[6] Throughout 2010, intensive emergency response efforts

The Haitian government and its partners scaled up efforts to improve community food and nutrition after the 2010 earthquake.

focused on saving children's lives and preventing undernutrition in earthquake-affected areas: Gonaives, Jacmel, Leogane, Petit Goave, and Port-au-Prince.

At the end of 2010, the Haitian government and its partners began intensified efforts to scale up preventive and recuperative community food and nutrition activities and to increase investments in water-sanitation-hygiene (WASH) and immunization in all of the country's 10 departments. As of May 2012, services continued throughout the country in 285 outpatient programs and 16 inpatient stabilization units for children with severe acute malnutrition, 174 baby tents for the promotion of optimal infant feeding practices and counseling for pregnant and lactating women, and 350 supplementary nutrition programs for children with moderate acute malnutrition (see Map for coverage of nutrition services).[7]



Preventive interventions were provided 6 days a week; curative interventions were provided every day. Nutrition interventions included promotion of optimal breastfeeding practices (early initiation of breastfeeding, exclusive breastfeeding for 6 months, point-of-use food fortification with multiple micronutrient powders to improve complementary foods for breastfed children ages 6–23 months), vitamin A supplementation for children 6–59 months, deworming for children 1–5 years, zinc for the treatment of diarrhea in addition to oral rehydration salt, iron/folic acid supplementation for pregnant and lactating women, ready-to-use supplementary foods, and integrated management of severe acute malnutrition.

METHODS: COMPARING FINDINGS FROM 2 LARGE SURVEYS

In this study, we sought to assess trends of child undernutrition in Haiti by comparing data from 2005–06 and 2012.

In March 2012, we conducted a nationally representative household survey of child nutritional status using Standardized Monitoring and Assessment of Relief and Transitions (SMART) methodology.[8,9] For comparison, we obtained and reanalyzed data from the HDHS 4, conducted by the Haitian Ministry of Public Health and Population (MOPHP) and Macro International between October 2005 and June 2006.[4] More information about survey design, data collection, and data management is available in the HDHS 4 final report.[4]

Both surveys (HDHS 4 and SMART) applied 2-stage sampling methodologies using the same national household sampling frame, which has been maintained and updated post-earthquake by the Haitian Institute of Statistics. After rural–urban stratification of the data, clusters of at least 25 households were randomly selected from each sampling area. Both surveys collected height and weight data for all children ages 0–59 months living in respondents' households. Interviewers obtained oral consent from parents before collecting children's data.

We calculated the prevalence of stunting (height-for-age z-score <-2 standard deviations [SD]), wasting (weight-for-height z-score <-2 SD), and underweight (weight-for-age z-score <-2 SD) for each survey using World Health Organization 2006 growth standards.[10] To account for sampling design, we applied probability weights to all analyses, using the SPSS 19.0 Complex Sample Module. We considered differences between the 2 surveys to be statistically significant when 95% confidence intervals did not overlap.

The Haitian MOPHP approved the SMART. ICF International gave permission to use the HDHS 4 data set.

RESULTS: IMPROVED NUTRITIONAL STATUS

We analyzed growth data for 2,463 (HDHS 4) and 4,727 (SMART) children ages 0–59 months. The table shows sample characteristics, response rates, and findings by survey.

Between the 2 surveys (2005-06 HDHS and 2012 SMART), the national prevalence of several nutrition-related indicators declined:

- Stunting declined from 28.5% (95% confidence interval [CI]=25.9, 31.3) to 22.2% (95% CI=20.2, 24.3)
- Wasting declined from 10.1% (95% CI=8.2, 12.7) to 4.3% (95% CI=3.6, 5.2)
- Underweight declined from 17.7% (95% CI=15.6, 20.1) to 10.5% (95% CI=9.3, 11.9)

The SMART findings for 2012 are similar to those of the 2012 HDHS,[5] which was conducted during the same period (see Figure). This similarity supports the robustness of the SMART findings.

The rural–urban gap in child undernutrition rates has decreased.

The rural–urban gap in child undernutrition rates has decreased. For example, in 2005–06, the prevalence of stunting in children under 5, which is associated with adverse long-term child development and economic impacts, in rural areas was 33.6% (95% CI=30.1, 37.2), while in urban areas it was 18.6% (95% CI=15.3, 22.5). In 2012, the prevalence of stunting in rural areas was 25% (95% CI=23.4, 26.7), and in urban areas, it was 18.4% (95% CI=16.7, 20.1). In other words, in 2005–06 the stunting rate was 15 percentage points higher in rural areas than in urban areas, while in 2012 the rural rate was 6.6 percentage points higher. The 2012 HDHS also found that the gap in rural–urban stunting rates had closed somewhat since the 2005-06 survey. The rural rate in the 2012 HDHS was 24.7%, while the urban rate was 15.6%.[5]

DISCUSSION

The decline between 2005–06 and 2012 in undernutrition among Haitian children 0–59 months old is statistically significant. The decline

TABLE. Sample Characteristics, Response Rates, and Results, HDHS 2005–06 and SMART 2012

	HDHS 2005–06 (N=2,463)	SMART 2012 (N=4,727)
	% (95% CI)	% (95% CI)
Response rate	99.6	98.0
Age, mean, months[a]	28.2[a] (27.5–29.0)	26.4[a] (25.9–27.0)
Sex (female)	51.2	50.4
Rural residence[b]	66.4	57.8
Underweight		
Total	17.7 (15.6–20.1)	10.5 (9.3–11.9)
Urban	12.3 (9.6–15.6)	8.6 (7.4–9.9)
Rural	20.5 (17.7–23.6)	11.7 (10.6–13.0)
Stunted		
Total	28.5 (25.9–31.3)	22.2 (20.2–24.3)
Urban	18.6 (15.3–22.5)	18.4 (16.7–20.1)
Rural	33.6 (30.1–37.2)	25.0 (23.4–26.7)
Wasted		
Total	10.1 (8.2–12.7)	4.3 (3.6–5.2)
Urban	7.5 (5.1–11.1)	4.3 (3.5–5.3)
Rural	11.6 (8.9–15.0)	4.0 (3.3–4.8)

Abbreviations: CI, confidence interval; HDHS, Haitian Demographic and Health Survey; SMART, Standardized Monitoring and Assessment of Relief and Transitions.
[a] The mean age of children in the SMART sample was significantly lower than that in the HDHS.
[b] Rural residence: households in villages or non-urbanized areas; urban residence: households in cities and towns.

Access to health and nutrition services improved between 2006 and 2012.

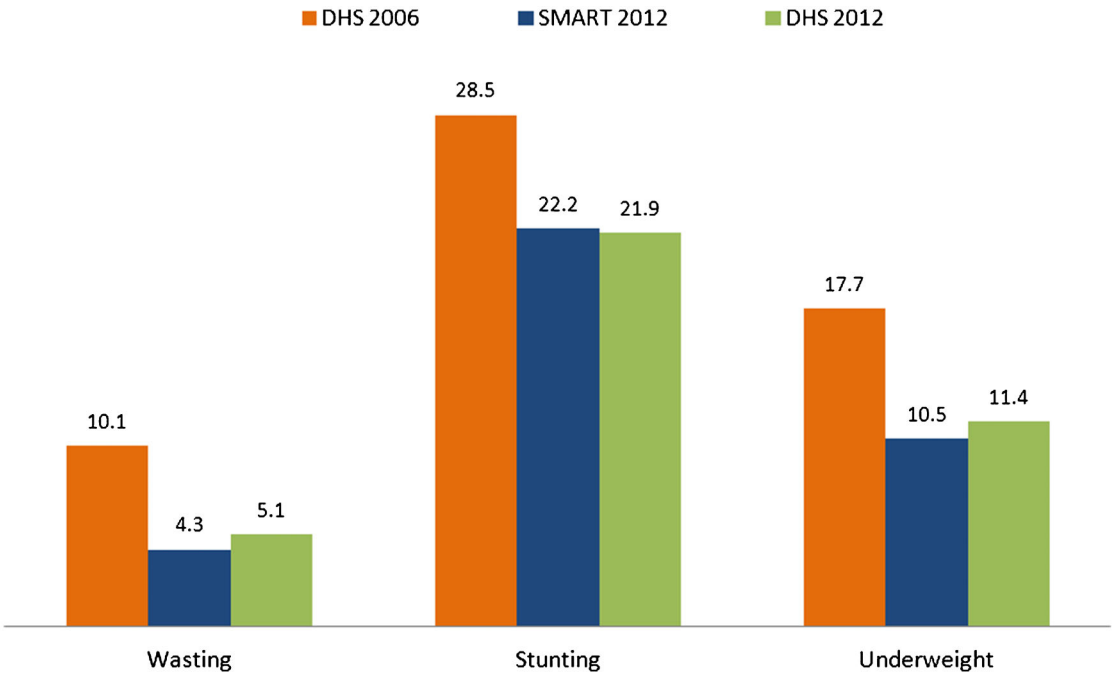
was more important in rural areas than in urban areas. The reasons for the more rapid decline in rural areas have yet to be elucidated.

At the national level, a number of factors may explain this observed decline in child undernutrition. Between 2006 and 2012, access to health and nutrition services improved,[4,5,8] as evidenced by higher percentages of:

- Women attending antenatal care (90.3% in 2012 versus 85% in 2005–06)
- Children immunized against measles (65% in 2012 versus 58% in 2005–06)
- Children with diarrhea treated with oral rehydration salt (52.9% in 2012 versus 40.3% in 2005–06)
- Early initiation of breastfeeding (64.2% in 2012 versus 44.3% in 2005–06)
- Vitamin A supplementation for children ages 6–59 months (44.4% in 2012 versus 28.7% in 2005–06)
- Households using adequately iodized salt (18% in 2012 versus 3.1% in 2005–06)
- Households using improved latrines (26% in 2012 versus 17% in 2005–06)
- Households having access to improved drinking water sources (64.5% in 2012 versus 55.2% in 2005–06)

There also was a slight reduction in the fertility rate (3.5% in 2012 versus 4% in 2005–06).

FIGURE. Comparison of Child Nutritional Status (%), 2006 and 2012, Haiti



Abbreviations: DHS, Demographic and Health Survey; SMART, Standardized Monitoring and Assessment of Relief and Transitions.

Furthermore, a few months after the 2010 earthquake, the government developed the National Action Plan for Recovery and Redevelopment,[11] and, by the end of December 2012, donors had disbursed US$6.4 billion to support Haiti's efforts to restore infrastructure, provide basic social services to the population, and improve the economic situation in the country.[12] In the months following the earthquake, food was distributed to about 4 million Haitians, and 900,000 received help in the form of cash-for-work or cash transfer to protect overall food consumption,[13,14] leading to a quick drop in the percentage of food-insecure households from 52% in February 2010 to 39% in June 2010.[15]

At the same time, major investments were made in integrated health, nutrition, and water, and sanitation and hygiene activities, particularly for the most vulnerable population groups living in camps. For instance, a strategy supported by the United Nations Children's Fund (UNICEF), called ''baby tents,'' was implemented in earthquake-affected areas, home to more than 65% of the country's population. The strategy protected and improved infant and young child feeding practices. Some 70% of infants less than 6

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In Haiti, health care workers counseled new mothers on how to provide appropriate complementary foods to their breastfed infants.

Children between the ages of 6–59 months received vitamin A supplementation.

months of age who participated in the baby tent program were reported to be exclusively breastfed. Furthermore, of those whose mothers initially reported mixed feeding (that is, breast milk plus other foods or liquids), 10% had moved to exclusive breastfeeding before the end of their stay in the program.[16]

UNICEF and the World Food Programme (WFP) also supported implementation of a program for integrated management of acute malnutrition throughout the country (see Map). Results were satisfactory. For example, among the 42,250 severely acutely malnourished children ages 6–59 months enrolled in UNICEF-supported therapeutic feeding programs in 2010, 2011, and 2012, recovery rates were over 75%, death rates were less than 10%, and defaulters were less than 15%.[17–19]

Pockets of malnutrition may remain in rural as well as peri-urban areas.

The nutrition-specific interventions (promotion of optimal breastfeeding practices, micronutrient supplementation, integrated management of acute malnutrition, etc.) and nutrition-sensitive interventions (immunization, diarrhea management, improved access to safe drinking water and sanitation facilities, hygiene promotion, cash transfers, etc.) that were implemented and accelerated after the earthquake are known to have a positive impact on child survival, growth, and development.[20]

Nonetheless, while these interventions reduce child undernutrition, the declines between the 2 surveys cannot be clearly attributed to these interventions alone. Indeed, as has been reported from Brazil,[21] these findings should be interpreted in light of investments and changes that occurred in different sectors (both within and outside health and nutrition) before and after the earthquake. It is also possible that the declines in undernutrition observed started prior to the earthquake and that the earthquake response accelerated that decline.

A few months after the deadly earthquake, Haiti faced a major cholera outbreak.[3,22] One might expect these 2 disasters to worsen children's nutritional status. Alternatively, if the children most likely to die in these disasters were the undernourished, the average nutritional status of the surviving children might appear to have improved over that of the pre-earthquake population. It is not likely, however, that either scenario had a great effect on the nutrition statistics. First, the humanitarian response to the earthquake was swift. Second, an effective treatment protocol for severely malnourished children with cholera was quickly developed and implemented to avert deaths.[23] The MOPHP indicates a low cholera case fatality rate among children under 5 years—0.7% (638 deaths out of 89,690 cases).[24] By comparison, among those over age 5, the rate was 1.3% (7,552 deaths out of 577,432 cases).

The earthquake also could have led to rural-to-urban migration in such a way as to reduce the rural–urban gap in nutritional status indicators. However, there are no data available, to our knowledge, that provide evidence of such shifts. In any case, the SMART survey was conducted 2 years after the earthquake; by that time, most of the displaced families had returned home.

There is a need to ascertain the remaining gaps in children's access to services because there is a real potential for pockets of malnutrition in rural as well as peri-urban areas. Our analyses could have been strengthened if the data had allowed comparisons across departments, especially in the relationship between the coverage of interventions and child malnutrition rates. Another potential limitation of our study is that it presents secondary data from just 2 data points, the 2005–06 HDHS and the 2012 SMART.

While the downward trend in childhood undernutrition in Haiti is encouraging, the overall prevalence of stunting remains high. Sustaining and accelerating the progress made so far will require concerted efforts that target direct and indirect causes of child stunting. These efforts should take into consideration the fact that the distribution of malnutrition is not uniform. Areas and groups still experiencing higher risks or levels of malnutrition need to be identified and assisted.

Acknowledgments: Authors would like to acknowledge Jing Yang, Cornell Statistical Consulting Unit, for her assistance with downloading and preparation of the 2005–06 HDHS data set, and Dr. Jean Max Beaulière, UNICEF–Haiti, for preparation of the map of nutrition services.

Competing Interests: None declared.

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Peer Reviewed

Received: 2013 May 10; **Accepted:** 2013 Oct 1

Cite this article as: Ayoya MA, Heidkamp R, Ngnie–Teta I, Pierre JM, Stoltzfus RJ. Child malnutrition in Haiti: progress despite disasters. Glob Health Sci Pract. 2013;1(3):389-396. http://dx.doi.org/10.9745/GHSP-D-13-00069

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ORIGINAL ARTICLE

As good as physicians: patient perceptions of physicians and non-physician clinicians in rural primary health centers in India

Krishna D Rao,[a,b] Elizabeth Stierman,[b] Aarushi Bhatnagar,[b] Garima Gupta,[c] Abdul Gaffar[d]

Non-physician clinicians (NPCs), including both specially trained medical assistants and physicians trained in India systems of medicine, perform similarly to physicians in terms of patient satisfaction, trust, and perceived quality, thus supporting the use and scale up of NPCs in primary care.

ABSTRACT

Background: Attracting physicians to rural areas has been a long-standing challenge in India. Government efforts to address the shortage of rural physicians include posting non-physician clinicians (NPCs) at primary health centers (PHCs) in select areas. Performance assessments of NPCs have typically focused on the technical quality of their care with little attention to the perspectives of patients. This study investigates patient views of physicians (Medical Officers) and NPCs in terms of patient satisfaction, perceived quality, and provider trust. NPCs include: Indian system of medicine physicians (AYUSH Medical Officers) and clinicians with 3 years of training, such as Rural Medical Assistants (RMAs). At PHCs without clinicians, paramedics provide clinical care, although they are not trained for this.

Methods: PHCs in the state of Chhattisgarh were stratified by provider type: Medical Officer, AYUSH Medical Officer, RMA, or paramedic. PHCs were randomly sampled in each group. A total of 1,082 exiting patients were sampled from138 PHCs. Factor analysis was used to identify perceived quality domains. Multiple regression analysis was used to test for group differences.

Results: Patients of Medical Officers and NPCs reported similar levels of satisfaction, trust, and perceived quality, with scores of 84% for Medical Officers, 80% for AYUSH Medical Officers, and 85% for RMAs. While there were no significant differences in these outcomes between these groups, scores for paramedical staff were significantly lower, at 73%.

Conclusions: Physicians and NPCs performed similarly in terms of patient satisfaction, trust, and perceived quality. From a patient's perspective, this supports the use and scale up of NPCs in primary care settings in India. Leaving clinician posts vacant undermines public trust and quality perceptions of government health services.

BACKGROUND

Clinical care providers with shorter duration of medical training than physicians provide primary health services in several developed and developing countries.[1–4] In places where physicians are scarce, as in several countries in sub-Saharan Africa, non-physician clinicians (NPCs) have become the main providers of primary health care, and, in some instances, even provide specialist services.[1,5–8] Evidence from both developed and developing countries suggests that NPCs can be effective primary care providers. In various settings they have been found to be as effective as physicians in managing conditions ranging from childhood illnesses, abortions, deliveries, emergency obstetric services, and cardiovascular conditions.[2,4–7]

Patient Perspectives

Performance assessments of NPCs have typically focused on the technical quality of their care with little attention to the perspectives of patients. Yet it is important to understand patient perspectives, such as

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Non-physician clinicians have been found to be as effective as physicians in managing conditions from childhood illnesses to emergency obstetric services and more.

satisfaction with the NPC, the perceived quality of care they received, and patient trust in the NPC. These perspectives are positively correlated with a range of behaviors, such as willingness to seek care, choice of provider, adherence to prescribed treatment, and recommendation of provider.[8–14]

Patients' satisfaction reflects the extent to which expectations of service standards have been met, and their perceptions of quality can yield important information about different aspects of service quality.[15] Patients' trust in a physician has been defined in several ways but generally refers to a patient's belief that the physician will act in the patient's best interest.[14,16] Although satisfaction and trust are related, there are important distinctions. Trust carries an expectation of future behavior, while satisfaction is concerned with the past. And while satisfaction captures patient opinions of the physician, trust more directly refers to their relationship on the basis of patient perceptions about the physician's motivations.[16,17] Trust has been conceptualized as having several domains covering physician competence, physician behavior, and global trust. The latter, which is a catch-all domain and employed in this study, captures aspects of trust in the different trust domains and beyond.[14,16]

Patients' satisfaction with and trust in their physicians affects their willingness to seek care and adhere to the prescribed treatment.

Types of Non-Physician Clinicians

In India, several types of NPCs provide clinical care at primary health centers (PHCs). In many states, AYUSH physicians trained in Indian systems of medicine (Ayurveda, Yoga, Unani, Siddha, and Homeopathy) are posted at PHCs with the aim of bringing Indian systems of medicine into the mainstream. Often they are the sole clinician present and practice both allopathic and their own system of medicine. Clinicians with 3 years of training in allopathic medicine operate in 2 states—the state of Chhattisgarh has posted Rural Medical Assistants (RMAs) at PHCs, while in Assam state, similarly trained Rural Health Practitioners (RHPs) serve at sub-centers. More recently, the central health ministry proposed to introduce a nationwide 3-year clinician course, the Bachelor's of Rural Health Care (BRHC). There has, however, been much concern about introducing such cadres, with critics questioning their necessity, their ability to perform all the clinical functions of a physician, their acceptability, and claims that such a program reflects discrimination against rural people.[18]

Patient Perceptions of Care

Despite the growing presence of NPCs in India, little is known about the quality of care they deliver and how patients view their services. An earlier study assessing the clinical competence of NPCs operating at PHCs in India found that RMAs are as competent as physicians in primary care settings, while AYUSH physicians received lower competence scores, and paramedics the lowest.[19]

The focus of this article is on patient views—their satisfaction, trust, and perceptions of quality of care—regarding the performance of physicians and NPCs. The study is set in the central Indian state of Chhattisgarh, where several types of clinicians serve at PHCs—physicians (Medical Officers), AYUSH Medical Officers, and clinicians with 3 years of allopathic training (RMAs). At many PHCs, paramedics (nurses and pharmacists) provide clinical services because no higher-level provider is available. However, they are neither trained nor expected to perform this job. In this study, AYUSH physicians and RMAs are considered NPCs. To the best of our knowledge, no study so far has examined patient perceptions of care provided by NPCs in a developing-country context.

Training of Rural Medical Assistants

In response to the shortage of Medical Officers in rural areas, the state of Chhattisgarh started to train RMAs in 2001. They receive 3.5 years of training followed by 1 year of internship. In contrast, physicians possessing a MBBS receive 5.5 years of training, including a 1-year internship. The RMA curriculum is essentially a compressed MBBS (Bachelor of Medicine, Bachelor of Surgery) program.[20] However, the RMA internship prepares the RMAs for rural service; RMAs spend 1 month at a sub-center, 3 months at a PHC, 4 months at a sub-district hospital, and 4 months at a district hospital where they are rotated through different departments. They receive a Diploma in Modern and Holistic Medicine on completing their training. RMAs can serve only at PHCs, and they perform all the clinical, public health, and administrative duties expected of a Medical Officer (except for post-mortems and medico-legal cases).

Training of AYUSH Physicians

AYUSH physicians in this study are ayurvedic physicians. They possess a Bachelor of Ayurvedic Medicine & Surgery (BAMS) degree, which involves the same duration of training as the

MBBS degree. They receive some exposure to allopathic medicine during training, and while in government service they are trained to manage conditions related to a range of national disease control programs such as malaria and tuberculosis. Available evidence indicates that it is common for AYUSH physicians to engage in ''mixed practice'' and prescribe allopathic medicines, although the legality of this is ambiguous.[21–23]

DATA AND METHODS

Ethics Statement

Ethical clearance for the study were received from the Public Health Foundation of India Institutional Review Committee and the World Health Organization's Research Ethics Review Committee. Consent was obtained following recommended guidelines.

Sampling and Data Collection

Data for this study were collected between July and September 2009. The study uses a cross-sectional design in which PHCs in Chhattisgarh were first stratified by the primary clinical care provider (Medical Officer, AYUSH Medical Officer, RMA, paramedic) present. A random sample of PHCs was drawn from each stratum to select a representative sample. Patients were sampled from the selected PHCs regarding their perceptions of the care received from the clinical provider.

In the first stage, a complete listing of PHCs and the staff present was compiled based on information supplied by the Department of Health and Family Welfare, Chhattisgarh, and verified with district health system managers. The staffing pattern of PHCs allowed the 706 PHCs in Chhattisgarh to be classified into 6 groups according to the main clinical care provider present: Medical Officers regular (210) and contractual (123), AYUSH Medical Officers (169), RMAs (63), paramedics (53), and others (88). The paramedical category comprised pharmacists, nurses, and others. The ''others'' category included auxiliary nurse midwives, dressers, and other support staff. In the rare instance where there was more than one clinician present, typically a Medical Officer (allopathic) and an AYUSH Medical Officer, the PHC was assigned to the senior-ranking clinician's (for example, Medical Officer) group.

PHCs who could not be reached because of poor roads or poor security were excluded. Further, contractual Medical Officers were excluded because they are qualified similarly to their regular counterparts. PHCs in the ''others'' group were excluded because they do not provide clinical care. The reduced sampling frame comprised 456 PHCs and the relevant groups limited to regular Medical Officers (205), AYUSH Medical Officers (135), RMAs (63), and paramedics (53). Simple random sampling without replacement was used to select 40 PHCs in each of the 4 groups included in the study.

A convenience sample of 10 outpatients was selected as they exited the PHC. Only those patients visiting the PHC for the first time for their current illness, and only those who were patients of the main clinical provider, were eligible for interviews. Patients, or their caregivers in the case of children, were interviewed after taking informed consent.

A total of 1,082 patients were interviewed at 138 PHCs, achieving 86.3% of the target sample size of 160 PHCs. Across all 4 groups, at least 80% of the target sample size was achieved. The target sample size of PHCs was not achieved completely because 14 clinical providers could not be contacted during the first stage; during the second stage, 3 PHCs could not be reached because of poor roads or poor security, and at 5 PHCs no patients were available when the surveyors visited during clinic hours. At several PHCs, fewer than the quota of 10 patients visited on the day the survey team arrived, which also contributed to the patient sample falling short of the target.

Patient Questionnaire

A structured questionnaire was used to collect information from patients on their socioeconomic background, satisfaction with services, and the quality of care they had just received. Patient satisfaction was measured by asking patients, ''How satisfied are you with your visit to this health facility?'' Possible responses were ''satisfied,'' ''neither satisfied nor dissatisfied,'' and ''not satisfied.''

Patient perceptions of quality were measured by asking patients to rate their level of agreement with a series of statements on different aspects of the service they had just experienced (for example, ''the doctor gave you adequate time''). Responses were recorded on a 5-point Likert scale ranging from ''completely disagree'' to ''completely agree,'' and a neutral point of ''neither disagree nor agree.'' Scale items used

in this study were taken from an earlier 16-item scale with good validity and reliability that was developed by the authors for inpatients and outpatients at a range of health facilities in India.[24] Two items related to the availability of toilets and drinking water were dropped because few outpatients experience these facilities during their visit. One item related to ease of obtaining drugs at the PHC was dropped because it added little new information. The final list contained 13 items.

Patient trust in the physician was measured using the single global trust item, ''You trust the skills and abilities of the doctor.''[16] Responses were recorded on a 5-point Likert scale.

Additional survey instruments were used to collect information on the background of the main clinical provider, the condition of the PHC, and characteristics of the village where the PHC is located.

Statistical Methods

The response rate to the questionnaire was high. Of the sample of 1,082 patients interviewed, there were a total of 8 non-responses across the 13 perceived quality items (0.05%). Missing values were imputed using the mean of the individual's scores for the remaining non-missing items.

Principal component analysis was used to determine dimensions of patient-perceived quality based on the 13-item scale. The importance of a component was evaluated by examining both scree plots and the contribution of each component to total variance ($\geq$5%). Maximum likelihood factor analysis with varimax rotation was then applied, with the principal component analysis results guiding the number of factors to be extracted. Items with substantial loadings ($\geq$0.49) on a single factor were retained. This process was repeated until all items had substantial loadings.

Perceived quality scores for the 4 dimensions of quality and on the single trust item were calculated by averaging the item response values. Average scores ranged from 1 to 5, with 5 being the highest quality rating. Scores were standardized so that each score was expressed in terms of number of standard deviations from the sample mean. Internal consistency reliability of the perceived quality scale was measured using Cronbach's alpha. Since the focus of this paper is on the PHC clinician, only results relating to the clinical consultation are presented.

Of interest is the difference in average perceived quality and trust scores between clinical provider groups (Medical Officer, AYUSH Medical Officer, RMA, and paramedic). Because provider quality, and consequently perceptions of quality, can be influenced by individual and contextual factors, we control for patient, PHC, and village characteristics using multiple regression.[25] In estimating group differences, the Medical Officer group was taken as the reference category. Because observations from interviews conducted at the same PHC will likely be correlated due to unobserved provider and facility effects, we applied robust clustering to the regression model with the PHC as the unit of clustering.

The independent variables included in the multiple regression model are detailed below. Patient characteristics included sex, age, household size, literacy, self-reported waiting time, and a ''wealth index'' constructed using principal component analysis of 11 items indicating ownership of selected household assets (for example, bicycle, cattle, radio).[26] PHC clinician characteristics included age, sex, and number of years he or she had worked at the PHC level. Facility characteristics included a PHC Infrastructure Index constructed using principal component analysis of 15 items related to the facility's infrastructure, such as the availability of electricity, water, and specific rooms for drug storage, cold chain, and consultations. Other variables included a measure of remoteness of the PHC's location (distance from the PHC to nearest road) and how well it was supplied (number of drug stockouts in the past year). Village-level characteristics included whether the village was located in a tribal area, and a Village Development Index was constructed using principal component analysis of 7 items indicating the presence of a secondary school, senior secondary/high school, regular electricity supply, piped water, tube wells, regular bus service, and cell phone connectivity. Stepwise regression methods were used to arrive at the final regression model. Model fit and assumptions were checked using residual plots. The statistical package STATA 8.2 was used for all statistical analysis.[27]

RESULTS

Sample Characteristics

Across all provider categories, the sample of patients interviewed was similar in proportion of males to females (3:2), average age (27 years),

and household size (6–7 members) (see Table 1). The age of patients ranged from under 1 to 81 years, with a similar age distribution across providers. Fever was the most common complaint in all groups (35%), followed by pain (15%), injury (8%), diarrhea (8%), and cough (6%). The literacy level among patients in the paramedical group (66% literate) was slightly lower than in other groups (71–74% literate). Patients visiting Medical Officers and RMAs had, on average, higher wealth index scores than the other 2 groups.

Among providers, the RMA group had the highest proportion of female providers (36%). RMAs were also, on average, younger and had spent less time working at the PHC level. This is unsurprising given the recent creation of the RMA cadre in 2001.

Facilities where AYUSH Medical Officers and paramedical staff were stationed had lower

TABLE 1. Characteristics of the Sample

	Medical Officer	AYUSH Medical Officer	Rural Medical Assistant	Paramedical Staff	All Providers
Patient Characteristics					
Male[a]	153 (57%)	184 (62%)	168 (62%)	139 (57%)	644 (60%)
Age (years)[b]	27.4 (19.6)	22.0 (17.5)	29.8 (21.7)	28.3 (21.6)	26.7 (20.3)
Literate[a]	192 (71%)	218 (74%)	203 (74%)	160 (66%)	773 (71%)
Household size[b]	6.6 (3.2)	6.3 (2.6)	6.2 (3.2)	6.7 (3.3)	6.4 (3.1)
Wealth index[b]	0.24 (1.9)	−0.48 (1.6)	0.23 (1.8)	0.06 (1.7)	0.0 (1.8)
Waiting time >10 minutes[a]	60 (22%)	40 (14%)	28 (10%)	7 (2.9%)	135 (13%)
No. of Observations	269	296	273	244	1082
Provider Characteristics					
Male[a]	26 (81%)	33 (94%)	23 (64%)	29 (83%)	111 (80%)
Age[b]	41.8 (7.1)	34.9 (6.2)	26.3 (1.8)	33.2 (11.3)	33.8 (9.1)
Experience at PHC level (months)[a]	145 (83.6)	39 (20.9)	11 (1.8)	108 (130)	74 (93)
No. of Observations	32	35	36	35	138
Facility Characteristics					
No. of drug stockouts in past year[b]	1.8 (3.0)	1.5 (2.5)	1.4 (1.5)	1.8 (2.8)	1.6 (2.5)
PHC infrastructure index[b]	0.84 (2.2)	−0.35 (1.6)	0.16 (2.0)	−0.59 (1.8)	0.0 (2.0)
No. of Observations	32	35	36	35	138
Village Characteristics					
Tribal[a]	8 (25%)	26 (74%)	12 (33%)	9 (26%)	55 (40%)
Village development index[b]	0.50 (1.0)	−0.85 (1.9)	0.05 (1.0)	0.34 (1.2)	0.0 (1.4)
Distance from PHC to nearest road (km) [b]	1.8 (4.4)	2.1 (5.3)	12.1 (66.5)	2.4 (5.1)	4.7 (34.2)
No. of Observations	32	35	36	35	138

Abbreviation: PHC, primary health center.
[a] N (%)
[b] Mean (standard deviation)

infrastructure index scores, on average, than those of Medical Officers and RMAs. AYUSH Medical Officers more often worked in tribal areas and in villages with lower levels of development.

Patient satisfaction was high for Medical Officers (84%), AYUSH Medical Officers (80%), and rural medical assistants (85%) but lower for paramedics (73%).

Patient Satisfaction

Overall, most patients (81%) reported being satisfied with their visit to the PHC (Table 2). Patient satisfaction in the Medical Officer (84%), AYUSH Medical Officer (80%), and RMA (85%) groups was high. However, the paramedical group reported a lower proportion of satisfied patients (73%).

Perceived Quality

The full range of responses was observed on each scale item (Table 3), although responses were skewed towards higher values. Factor analysis results are shown in Table 2. Four components of perceived quality were identified: medical advice, medical consultation, staff behavior, and facility infrastructure. These 4 dimensions correspond to those in the source study for the scale items.[24] All 4 dimensions had fairly good reliability with Cronbach alpha values above 69%. Perceived quality scores on the dimensions of medical advice (3.3) and medical consultation (4.0) were above average (maximum 5.0).

Perceived Quality of Medical Advice

Overall, the average score for the medical advice dimension was 3.3 (maximum 5.0). The standardized scores for RMAs and Medical Officers were 0.17 and 0.07 standard deviations above the sample mean, respectively; for AYUSH Medical Officers, the scores were 0.11 and 0.14 standard deviations below the sample mean, respectively (Table 2). No significant differences (95% CI includes 0) were observed between Medical Officers and any of the other groups, both before and after adjusting for provider, patient, PHC, and area characteristics.

Perceived Quality of Medical Consultation

The average score for the medical consultation dimension was 4.0 (maximum 5.0). Standardized scores were highest for RMAs (0.19) followed by Medical Officers (0.12), AYUSH Medical Officers (−0.06) and paramedics (−0.27) (Table 2). Significant differences were found only between the paramedical group and Medical Officers. After controlling for provider, patient, PHC, and area characteristics, no significant differences were observed between the Medical Officers and other groups. However, the 95% confidence interval for the adjusted mean difference between the Medical Officer and paramedical groups almost excludes 0.

Patient Trust

Patient trust in PHC clinicians was high, with the average score being 4.2 (maximum 5.0). Standardized scores were highest for the Medical Officer group (0.24), followed by RMA (0.03), AYUSH Medical Officer (−0.04) and paramedical (−0.24) (Table 2). Only paramedical staff had significantly lower average adjusted standardized scores than Medical Officers (95% CI excludes 0).

DISCUSSION

Performance assessments of non-physician clinicians have typically focused on the technical quality of their care and largely ignored the perspectives of patients. Interestingly, meta-analyses of studies on nurse-practitioners operating in developed countries have found that patient health outcomes were similar for nurses and doctors, but patient satisfaction was higher with nurse-led care.[2,28,29] As mentioned above, an assessment of the clinical skills of RMAs and AYUSH Medical Officers in Chhattishgarh found that the clinical competency of Medical Officers was similar to that of RMAs, but significantly higher than that of AYUSH Medical Officers, for managing common conditions seen in primary care settings.[19]

Patients Equally Satisfied with NPCs and Physicians

In this study, we examined patient views of different types of clinical care providers operating at PHCs in Chhattisgarh state. Patients were equally satisfied with Medical Officers, AYUSH Medical Officers, and RMAs. Further, patients reported similar levels of trust in the ability of these clinicians, and similar ratings of quality, in terms of medical consultation and medical advice. No statistically significant differences were found between Medical Officers and RMAs, nor between Medical Officers and AYUSH Medical Officers, on any of these indicators. In contrast, on all these indicators, paramedics received significantly lower scores than Medical Officers (except for perceived quality of medical advice). These findings indicate that, from the perspective of

TABLE 2. Patient Perceptions of Quality and General Satisfaction Scores

	Medical Officer	AYUSH Medical Officer	Rural Medical Assistant	Paramedical Staff	Cronbach's Alpha
Patient Satisfaction, N (%)[a]	224 (84%)	238 (80%)	231 (85%)	178 (73%)	
Dimensions of Perceived Quality					
Medical Advice (3 items)					0.74
Standardized score, mean (95% CI)	0.07 (−0.13, 0.26)	−0.11 (−0.25, 0.04)	0.17 (−0.04, 0.31)	−0.14 (−0.39, 0.11)	
Adjusted mean difference, mean (95% CI)[b]	Reference	−0.08 (−0.29, 0.14)	0.19 (−0.08, 0.45)	−0.12 (−0.40, 0.16)	
Medical Consultation (4 items)					0.79
Standardized score, mean (95% CI)	0.12 (−0.09, 0.33)	−0.06 (−0.23, 0.12)	0.19 (0.01, 0.36)	−0.27 (−0.50, −0.04)	
Adjusted mean difference, mean (95% CI)[b]	Reference	−0.06 (−0.26, 0.15)	0.12 (−0.12, 0.35)	−0.21 (−0.44, 0.01)	
Staff Behavior (3 items)					0.82
Standardized score, mean (95% CI)	−0.03 (−0.15, −0.09)	−0.08 (−0.23, 0.07)	0.09 (−0.08, 0.26)	0.03 (−0.17, 0.23)	
Adjusted mean difference, mean (95% CI)[b]	Reference	0.09 (−0.06, 0.24)	0.15 (−0.04, 0.33)	0.08 (−0.09, 0.25)	
Facility Infrastructure (3 items)					0.69
Standardized score, mean (95% CI)	0.06 (−0.12, 0.24)	−0.06 (−0.23, 0.11)	0.14 (−0.06, 0.35)	−0.15 (0.51, 0.21)	
Adjusted mean difference, mean (95% CI)[b]	Reference	0.10 (−0.14, 0.34)	0.23 (−0.06, 0.52)	−0.002 (−0.25, 0.24)	
Patient's Trust in Clinician's Skill and Ability					
Standardized score, mean (95% CI)	0.24 (0.10, 0.38)	−0.04 (−0.20, 0.12)	0.03 (−0.14, 0.19)	−0.24 (0.46, −0.02)	
Adjusted mean difference, mean (95% CI)[b]	Reference	−0.12 (−0.29, 0.05)	−0.08 (−0.27, 0.11)	−0.30 (−0.47, −0.14)	
Observations	269	296	273	244	
Number of facilities (clusters)	32	35	36	35	

[a] Five values for general patient satisfaction were missing; missing values were omitted from calculations.
[b] Results for AYUSH, Rural Medical Assistant, and paramedical are the difference in mean scores between their group and the Medical Officer group, after controlling for the sex, age, wealth, and literacy of the patient; the sex and age of the clinical provider; and facility infrastructure and location (tribal area and distance to nearest road).

TABLE 3. Rotated Factor Loadings for Scale Items Measuring Patient Perceptions of Quality

Scale Items	Factor 1 Medical Advice	Factor 2 Medical Consultation	Factor 3 Staff Behavior	Factor 4 Facility Infrastructure
The doctor gave you complete information about your illness	**0.7639**	0.1559	0.1004	0.076
The doctor gave you complete information about your treatment	**0.7236**	0.1571	0.1518	0.1122
The doctor gave you advice about ways to avoid illness and stay healthy	**0.493**	0.2062	0.1809	0.1392
Staff of the health facility talked to you politely	0.1226	0.1797	**0.7163**	0.1055
Staff of the health facility were helpful	0.1567	0.195	**0.7398**	0.1342
Staff behavior was good	0.0797	0.2126	**0.7501**	0.1352
The doctor gave you adequate time	0.1711	**0.5901**	0.3463	0.0986
The doctor listened carefully to what you had to say	0.1172	**0.6832**	0.2631	0.0777
The doctor checked you properly	0.269	**0.6117**	0.1441	0.2124
The doctor was ready to answer all your questions	0.1703	**0.6462**	0.2189	0.0969
Cleanliness of the health facility was adequate	0.1205	0.0621	0.1663	**0.5349**
This health facility had all requisite amenities	0.107	0.1453	0.1366	**0.7675**
This health facility had all the drugs you needed	0.1072	0.1065	0.1984	**0.5522**

Items in boldface represent those that have high loadings on a particular factor. Items with high loadings were then used to interpret the factor and to construct the perceived quality sub-scales.

patients, AYUSH Medical Officers and RMAs appear to be as acceptable as Medical Officers. This provides support to the policy of deploying NPCs at PHCs in India.

Poor Care and the Erosion of Trust

Paramedics consistently received the lowest patient evaluations, whether it was for satisfaction with services, trust in their abilities, or ratings of the quality of the consultation. This is expected since the paramedics in the sample (31 pharmacists, 2 nurses, and 2 other paramedics) were not trained to provide clinical care but did so because no qualified clinician was present. It is important to recognize that in many other countries, nurses with special training (for example, nurse clinicians, nurse-practitioners) do provide quality clinical care, including prescribing medications.[1,2,28,29] However, no such cadre of nurses currently exists in India. Neither are pharmacists trained to diagnose and treat patients, and the high number of pharmacists who are providing clinical care is worrying. This highlights the danger of leaving clinician posts vacant at health facilities. Moreover, the presence of poorly qualified providers undermines public trust and perceptions of quality in the services offered and in government health services more generally.

Other Factors to Consider

The levels of patient satisfaction with services at the local PHC reported in this study were similar to those reported for government health facilities in large household surveys in India.[30] All exit interviews were conducted at PHCs, and patients referred to the Medical Officers, AYUSH Medical Officers, and RMAs as ''doctor,'' indicating that these cadres' identities were not differentiated by patients (or in the questionnaire). Paramedics (pharmacists and nurses), however, were known by their cadre identities. The case mix and patient characteristics, which influence user views on services, can systematically vary across groups, given that geographic location or the type of provider present might influence care-seeking

behavior. When we investigated this, we found that the distribution of presenting symptoms was similar across groups, suggesting that the case mix might also be similar between groups. Further, in the analysis we attempted to minimize this factor by examining group differences after controlling for patient and other characteristics. Because our analysis was based on a convenience sample of users (patients at health facilities), findings from this study cannot be generalized to the larger population. Non-users are likely to have different perceptions of PHCs and the providers present there compared with users. For instance, we would expect non-users to have lower trust or satisfaction with the local PHC. Finally, issues of absenteeism continue to be a problem, even with NPCs.

Severe Staffing Shortages at Primary Health Centers

In several countries, NPCs play an important role in delivering basic health services. To increase the presence of clinicians in rural communities, several states in India have staffed PHCs with NPCs such as AYUSH Medical Officers or clinicians with shorter duration of clinical training such as RMAs. At the time of this study, only 47% of the PHCs in Chhattisgarh had a physician present, indicating the severe shortage of physicians in rural health centers. In 32% of the PHCs, which were mostly located in remote and tribal areas, the presence of either RMAs or AYUSH Medical Officers enabled these health centers to continue providing clinical care. Our findings indicate that patients had similar levels of satisfaction, trust, and perceived quality with Medical Officers and NPCs.

Non-Physician Clinicians Are Part of the Solution

Successful primary health care is built on the trust and rapport between clinicians and the communities they serve. As India attempts to achieve health care for all, reducing the shortage of qualified clinicians in underserved areas needs to become a priority. NPCs, whether they are clinicians with 3 years of training, nurse-practitioners, or AYUSH physicians, can be an important part of the solution, as long as they possess a standard level of clinical competence, and their patients are satisfied with—and trust—the care they receive.

Acknowledgments: The authors would like to thank the Alliance for Health Systems and Policy Research (ASHPR), WHO, and the following individuals for their technical support: Dr. T. Sundararaman of the National Health Systems Resource Center (Delhi), Dr. Pascal Zurn of WHO, Dr. Peter Berman at the Harvard School of Public Health, and Dr. Kamlesh Jain, Puni Kokho, and Dr. AR Antony of the State Health Resource Center, Chhattisgarh.

Competing Interests: None declared.

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Peer Reviewed

Received: 2013 Jun 10; **Accepted:** 2013 Aug 14; **First Published Online:** 2013 Oct 7

Cite this article as: Rao KD, Stierman E, Bhatnagar A, Gupta G, Gaffar A. As good as physicians: patient perceptions of physicians and non-physician clinicians in rural primary health centers in India. Glob Health Sci Pract. 2013;1(3):397-406. http://dx.doi.org/10.9745/GHSP-D-13-00085

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ORIGINAL ARTICLE

Simulated clients reveal factors that may limit contraceptive use in Kisumu, Kenya

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While the quality of family planning service delivery was often good, clients reported barriers including: excessively long waiting times, provider absences, informal fees, inappropriate pregnancy tests, misinformation, and provider disrespect. Improved monitoring and oversight of facility practices and examination of provider needs and motivations may increase quality of service.

ABSTRACT

A better understanding of the factors influencing use of family planning has the potential to increase contraceptive prevalence and improve the ability of women and their partners to freely choose the number and spacing of their children. Investigations into factors contributing to unmet need frequently rely on data collected using household surveys or interviews with family planning clients and providers. Our research utilizes qualitative information resulting from simulated client visits to investigate programmatic barriers to contraceptive use in a sample of 19 health care facilities in Kisumu East District, a city in western Kenya. Simulated client reports indicate deficiencies in provider competence as well as tenuous relations between providers and clients. In addition, simulated client data reveal occasional absences of providers during normal facility hours of operation and requests of informal fees for services. Trainings that address specific gaps in provider medical knowledge and counseling skills as well as client-provider relations may reduce such programmatic barriers to contraceptive use. In addition, improved supervision and oversight at facilities may increase physical and financial access to services. Future research investigating provider motivations may illuminate root causes of programmatic barriers.

BACKGROUND

The life-saving benefits of family planning to both mother and child are well established.[1–5] In the past 20 years alone, maternal deaths in developing countries have been reduced by 40% in response to increased access to contraceptive services.[6] Yet, despite the success of many family planning programs in Asia and Latin America over the past 60 years, fertility rates in sub-Saharan Africa remain high.[1] At 5.2, the total fertility rate (TFR) for sub-Saharan Africa is more than twice the global average.[7–9] Those women who prefer to space or limit births but are not using any method of contraception are considered to have an unmet need for family planning.[10] A better understanding of the programmatic factors influencing contraceptive use may help to address the persistent unmet need in numerous African countries.

Quality and Access

The evaluation of family planning programs in developing countries is frequently guided by frameworks first developed in the 1980s and early 1990s.[11,12] Quality of care, hypothesized to be a key determinant of contraceptive use, is defined by the Bruce-Jain framework and includes 6 aspects: method choice, information, client relations, provider competence, follow-up mechanisms, and integration.[12] Access to services, sometimes referred to as availability, can refer to geographic or financial accessibility as well as the ability of potential clients to gain contact with service providers at facilities where they are seeking services[11]; access has also been found to be related to use or non-use of family planning.[13] Access to family planning services can be inhibited by certain provider practices such as use of excessively restrictive medical criteria or

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provider bias against certain methods; these practices are often referred to as medical barriers to family planning[11,14,15]; addressing medical barriers may facilitate improvements in quality of care.[11]

Measuring Progress

A better understanding of the programmatic factors influencing contraceptive use may help to address persistent unmet need in many African countries.

The quality of nationally sponsored family planning programs in Kenya was first assessed in 1989.[16] These national programs began in Kenya in 1967 in response to high fertility rates and rapid population growth.[17,18] The first evaluation of these programs provided evidence that government-sponsored family planning programs, long criticized for "poor performance,"[17] were beginning to show improvement in critical areas of service quality such as method choice and client treatment; however, progress was lacking in discussion and management of contraceptive side effects, as well as wait time and inquiry into the client's reproductive goals.[16,17,19] Only a handful of studies since 1989 have used facility-level data to measure family planning service delivery quality in Kenya at a national level; a 1995 study found improvements in discussion of side effects,[19] and a study using data from 2004 to compare public and private facilities found no differences in the technical capacity of service providers by facility type.[20]

The Simulated Client Approach

In the simulated client approach, a trained female data collector pretends to be a new client at a health facility and undergoes a family planning counseling session.

While most investigations of facility-level factors influencing contraceptive use rely on data collected through provider and client interviews, this article takes a less common approach by describing interactions between health care providers and *simulated* family planning clients.[21–29] The simulated client approach provides an unobtrusive means of collecting data about service delivery and is likely to provide more accurate data than approaches using client or provider interviews or third-party observations.[26]

The data presented here are part of a larger study conducted in the Kenyan city of Kisumu, located in a region with a TFR of 5.4.[30] The study design uses the simulated client methodology to test the validity of standard data collection instruments typically employed to measure family planning service quality and infrastructure at service delivery points. These standard instruments, collectively known as the Situation Analysis, include a facility audit, an observation guide, and questionnaires for interviewing family planning clients and service providers.[31,32] As part of our validation study, these standard instruments were employed at the same facilities where the simulated client method was used. Analysis of validation data is ongoing. The objective of this paper is to share information provided by the simulated client method that would have gone unobserved if data collection had relied solely on the standard instruments.

METHODS

Data for this study were collected in 19 public and private health care facilities of medium to high volume located in Kisumu East District, Kenya, in 2012. In the simulated client approach to facility-level data collection, a trained female data collector pretends to be a new family planning client at a health facility and undergoes a family planning counseling session. Following the counseling session, the simulated client records or reports her observations.

For this study, 6 simulated female clients were hired and trained. Simulated clients ranged in age from 23 to 30, with parity ranging from 0 to 3 children. All 6 clients were assigned a "preferred method" of contraception to request from the provider, which allowed investigators to examine provider practices across a range of methods. Of the 6 simulated clients, 3 were assigned a preferred method of oral contraceptive pills (OCPs), 1 was assigned a preferred method of injectables, 1 the intrauterine device (IUD), and 1 the contraceptive implant. See the simulated client profiles (Table 1) for additional information on the background characteristics of each simulated client. In addition to visits from simulated clients, all 19 selected facilities participated in a facility audit, third-party observations, and interviews with exiting family planning clients and service providers.

Simulated clients assigned to prefer OCPs were trained to accept 1-3 packs of pills when offered. Those clients assigned to prefer injectables, the IUD, or the implant were trained to conclude their counseling session before such methods could be administered in order to avoid receiving unwanted procedures. A list of culturally appropriate and credible reasons for concluding services prior to receiving commodities was determined with input from all data collectors during the 1-week training period. Some examples of credible reasons include:

- I need to ask my husband first
- Let me go think about it

TABLE 1. Profiles of Simulated Clients

	Simulated Clients					
	1	**2**	**3**	**4**	**5**	**6**
Age	27	24	28	28	23	30
Residence	Non-slum	Non-slum	Slum	Slum	Slum	Slum
Marital status	Unmarried	Unmarried	Married	Unmarried	Married	Married
Parity	0	0	2	1	0	3
Preferred method	Pills	Injectable	IUD	Pills	Implant	Pills

- I changed my mind, I just want the condom
- I don't have the money, let me go and come back
- I want to compare with another facility

There were an estimated 108 providers offering family planning services at the 19 participating facilities. This study was designed so that each of these providers would be visited by 1 of the 6 simulated clients; however, many facilities schedule only 1 provider to offer family planning each month or each quarter (3 months). As a result, it was not possible to collect simulated client data on all family planning providers at the 19 facilities during the study period. Multiple attempts were made to collect data on different providers by sending different simulated clients back to participating facilities; these repeat visits often resulted in multiple observations of the same provider, as seen in Table 2. Of the 52 providers reached in the study, 21 providers were visited just once. In 10 of the 19 facilities, simulated clients succeeded in visiting all family planning providers working at the facility; in another 2 facilities, clients were able to visit all but 1 of the family planning providers. In the remaining 7 participating facilities, simulated clients visited between 14% and 44% of the family planning providers. Approximately 56 family planning providers within selected facilities, or 52% of all estimated providers, were not visited by a simulated client. However, a majority of providers not visited by a mystery client were not providing family planning services or were off-duty during the study period.

The sample of 19 facilities was selected to include all medium (11) and high volume (8)

TABLE 2. Distribution of Simulated Client Visits Per Provider

	Number of providers receiving client visits	**Total simulated client visits (# providers X # client visits)**
Providers with 1 simulated client visit	21	21
Providers with 2 simulated client visits	11	22
Providers with 3 simulated client visits	4	12
Providers with 4 simulated client visits	6	24
Providers with 5 simulated client visits	5	25
Providers with 6 simulated client visits	5	30
Total	52 providers	134 visits

health care facilities currently providing family planning services within Kisumu East District. The volume of facilities was determined through conversations with local NGO staff and by visiting the potential facilities to determine the number of family planning clients serviced in the preceding week, according to the official patient registration log (medium = <10; high = <25). The sample included both public (14) and private (5) facilities, and all of the selected facilities also offered maternal and child health services and/or HIV-related services in addition to family planning services. Data collection took place August 1–17 and Sept 17–28, 2012. The service providers included in the study are those who were providing services on the day a simulated client attended their facility.

Simulated clients recorded their observations soon after their counseling session with a short user-friendly and objective checklist. The checklist, informed in part by MEASURE Evaluation's Quick Investigation of Quality,[32] was designed to capture quantitative data on aspects of family planning service delivery quality, according to the Bruce-Jain framework.[12]

In addition to these quantitative data, all 6 mystery clients had the opportunity to provide any additional information they observed while at the selected facility. This additional information, provided in both written and verbal format to the study principal investigator (and first author) in an unsolicited manner at the end of each day of data collection, provides in-depth insights for this paper; where appropriate in the paper, this information is supplemented with quantitative data from the simulated client checklist. All 6 simulated clients volunteered additional information, which was not restricted to any specific topic and was subsequently entered into a Microsoft Word document and organized into 4 emergent themes: interpersonal relations, provider competence, provider accessibility, and inappropriate charges to clients. It is important to note that the quotes provided in the results section are all drawn from this informal feedback, which was not collected in a systematic manner, and are therefore not representative of high/medium volume facilities in Kisumu.

According to the quantitative checklist tool, 1 in 5 providers displayed reportedly negative attitudes towards clients.

Confidentiality was a key component of the ethics training received by the simulated clients. Each simulated client was required to sign a pledge of confidentiality upon completion of the training. Facility managers were aware of and supportive of the study. The University of North Carolina at Chapel Hill (UNC-Chapel Hill) and the Kenya Medical Research Institute (KEMRI) reviewed and approved the study protocol and informed consent process for this study.

RESULTS

The 6 simulated clients completed a total of 134 visits with 52 providers (88% of whom were female) at the 19 participating facilities. To our knowledge, providers did not identify simulated clients during their visit, although they may have been made aware of the potential for a simulated client visit by their facility supervisor, who consented to participate in the study. In 1 instance, a simulated client reported she thought her provider became suspicious because the provider brought additional staff into the examination room to observe the consultation and questioned the client's motivation to use a contraceptive method. Outside of this 1 event, all simulated clients reported that they felt confident the observed providers did not identify their true purpose.

Client-Provider Interactions

In 5 out of the 134 simulated client visits, the client volunteered unsolicited feedback characterizing their provider as ''friendly,'' ''respectful,'' or ''nice.'' These 5 voluntary reports of positive client interaction reference 4 providers (1 provider received 2 positive reports) working at 2 public and 2 private facilities. Clients volunteering positive reports had expressed a preference to their provider to use either pills or implants. One client provided an account of a provider who did a good job discussing the different family planning options. Another client reported that her provider was very encouraging of the client's desire to begin a contraceptive method. The following demonstrates a provider taking steps to ensure client access to a method not currently available at the facility:

> *Despite the fact that the method I wanted was not available in the facility, the provider managed to tell me more about the method I had chosen and she even made a call to the family planning team which was going around in various facilities to provide family planning services which were not available in those facilities.*

However, not all accounts of interactions with providers were positive. According to

quantitative checklist data, providers failed to greet simulated clients in a respectful or friendly manner at 18% of visits; these 24 visits were spread across 13 different facilities, 2 of which are private, and 17 different providers. Of the 17 providers with a reportedly unfriendly manner, 16 were visited by more than 1 simulated client. Of the 16 providers with multiple visits, 4 received more than 1 negative report; in only 1 case did all simulated clients report independently that the provider was lacking in respect. Half of the negative reports came from clients assigned to prefer OCPs; this is not surprising given that half of the 6 simulated clients had this assignment. Unfriendly behavior was rarely reported by the implant client (8% of all negative reports) or the IUD client (also 8% of all negative reports). Of the negative reports, 38% came from the simulated client assigned to prefer injectable contraception; it is possible this is more a reflection of this client's age (24 years) than her preferred method.

All 6 simulated clients voluntarily mentioned rude or disrespectful treatment at some point by 1 or more service providers visited during the study. According to informal feedback, in 2 public facilities, a provider reportedly stated ''family planning is not an emergency'' in an effort to explain long wait times or to appease clients who could not be seen on the same day that they arrived. As 1 client reported:

> *The provider was so rude… arrogant. Women were really complaining. The provider yelled at the clients and told them no one can challenge her on family planning. If she wanted to, she could tell everyone to just go home and come back another day. She said, 'I'm tired of injecting your buttocks every day.'*

In addition to the providers displaying reportedly negative attitudes towards clients (according to the quantitative checklist tool), with 1 provider going so far as to engage in such behavior as shouting at clients (according to informal feedback), 1 additional provider harbored unfounded suspicions that affected client access to desired methods. In this case, a simulated client seeking injectable contraception was strongly accused of coming to the facility knowing that she was pregnant, in the hopes that receiving an injection would induce an abortion. Due to this suspicion on the part of this provider at a public facility, the simulated client was not offered any family planning method.

Technical Competence of Service Providers

According to a combination of quantitative checklist data and informal feedback, in 10% of all simulated client visits (13 visits with 10 different providers at 8 public facilities), the service provider refused to offer the client their preferred method of contraception unless the client was able to provide physical evidence of current menstruation or was willing to take a pregnancy test (at an additional cost of 100 to 150 Kenyan shillings, equivalent to US$1.18–$1.76). In the remaining 90% of simulated client visits, all clients were offered their preferred method or were referred to a facility where their method could be obtained.

Of the 13 instances where unnecessary menstrual requirements were imposed, 9 occurred with clients requesting OCPs, 3 during requests for injectable contraception, and in 1 instance with a client requesting the implant. In explaining this medical barrier, 1 mystery client reported:

> *The provider advised me to go back (to the clinic) when on menses or to do a pregnancy test so as to prove there was no pregnancy.*

In no instance did any of these 10 providers attempt to rule out pregnancy by another means, such as inquiring about unprotected intercourse since the client's last menstrual period. Clients unable to meet these requirements were instructed to return at their next menses or when they had funds for a pregnancy test. In most cases, clients who were turned away were not offered an alternative method, such as condoms, for use in the meantime. Interestingly, among those providers imposing menstrual requirements and with multiple simulated client visits, some did not impose these requirements for all hormonal types or all simulated clients; for example, 2 providers imposed menstrual requirements for OCPs but no other hormonal method, while another imposed requirements only for injectables clients. Two of the providers refused to offer OCPs to some, but not all, of the simulated clients requesting this method without proof of menstruation or pregnancy test.

Simulated client reports indicate deficiencies in provider competence as well as tenuous relations between providers and clients.

In addition to medically unnecessary menstrual requirements,[15,33] several providers reportedly dispersed misinformation to clients. For example, 1 simulated client volunteered feedback that she was sometimes discouraged from using injectable contraception due to concerns about excessive delays in the time it takes the average client to return to fertility; more than 1 provider stated average return to fertility for a client

Data reveal occasional absences of providers during normal facility hours and requests of informal fees for services.

discontinuing injectable contraception is 2 years or greater. In refusing to offer injectable contraception to a simulated client, 1 provider at a public facility stated ''the injection can't be given to someone who has not had kids.'' In another instance, a client visiting a private facility was provided misinformation by her provider about the IUD:

> *My provider told me … payment depends on the type (of IUD), for example, one for 5 years costs 1,000 KSh (equivalent to US$11.76), one for 10 years costs 2,000 KSh (US$23.53), one for 15 years costs 3,000 KSh (US$35.29).''*

These different versions of the copper-bearing IUD do not exist.[34]

Simulated clients also volunteered information suggesting that at least 3 of the 44 providers visited by a mystery client at a public facility may not have been trained to deliver family planning services. For example, in 1 public facility, all 6 simulated clients were offered family planning services by a person volunteering as a mentor for HIV patients. At another public facility, staff members performing patient registration or lab work also provide family planning counseling when the facility is short-staffed. It was unclear whether these personnel had adequate training in provision of family planning methods to step into this role.

Provider Accessibility

Simulated clients frequently mentioned excessively long wait times, often due to large numbers of clients and few providers, which resulted in their inability to make contact with the targeted provider during the first attempt. For example, 2 simulated clients arrived on the same day at the same public facility shortly before 9 am, waited until 4 pm without receiving services, and were then asked to return another day. Another client arrived at a different facility at 11 am and waited until closing without receiving services; she was also told to come back another day. In total, 4 simulated clients were turned away at the end of the day without receiving services after waiting most of the day; this occurred at 3 different facilities, 1 of which was private.

Of those visits for which they were not turned away at the end of the day, simulated clients waited an average of 3 hours between arrival and departure at the facility (according to the checklist instrument), and, in 19% of visits, simulated clients waited 5 or more hours at the facility. Furthermore, those seen after an acceptable amount of wait time sometimes felt the provider was unable to offer the necessary time and attention. As 1 client reported, ''The provider was in a hurry. She wanted to go for lunch and just counseled me in the hallway.''

In other cases, simulated clients mentioned that care was delayed because providers arrived late to the facility (some arriving as late as 12 pm despite official opening times of 8 am in all 19 facilities), or the facility opened late, or the providers did not return to the facility after the lunch break. This type of delayed care occurred on 7 occasions, at 7 different facilities, 2 of which were private. In cases where the provider did not return after lunch, the clients waited until closing time without ever receiving services. In 1 case, a client arrived at 2 pm on a Friday and found the provider promptly, but the provider informed the client that she was tired and asked her to come back on Monday. The provider did not offer the client any contraceptive method, such as condoms, for protection over the weekend. The official closing time on Fridays at this facility is 5 pm.

Provider accessibility was also sometimes compromised by competing duties; in a facility where no other provider was on hand that day, a simulated client reported, ''The provider did not complete the service because she received a phone call telling her to go somewhere.'' The client had to leave the facility without completing the family planning counseling session and without receiving any method of contraception.

Inappropriate Charges to Clients

In 3 out of every 4 simulated client visits where the client received 1 or more packs of OCPs (a total of 57 visits), the client was charged a fee greater than the price reported by the facility manager. Often the client was charged 50 Kenyan shillings (approximately US$0.59) in a facility where the manager indicated pills are provided for free, including patient registration. In some cases (12 visits), other simulated clients attending the same facility but seeing a different provider were charged a different price or were not charged at all, indicating inconsistencies in fee collection within facilities. On 2 occasions, service providers refused to provide clients with receipts and were observed putting the fee directly into their pockets while still in the closed door counseling or examination room. Of the 14 facilities engaging in informal fee collection, 3 are private facilities. Because simulated clients were unable to accept invasive or unwanted

procedures (such as an injection, IUD, or implant) for ethical reasons, we were unable to ascertain whether inappropriate fees are charged for methods other than OCPs.

DISCUSSION

These data, resulting from 134 simulated client visits with 52 providers in 19 public and private facilities, provide information on family planning service provision in Kisumu East District as it would occur naturally, in the absence of a data collection team. Simulated clients reported rude or disrespectful treatment by a number of providers, including shouting and unfounded accusations, and clients reported receiving services by 3 possibly untrained staff. Medical barriers were also observed, including unnecessary menstrual requirements and misinformation resulting from provider bias against injectable contraception for nulliparous women. Simulated clients sometimes waited at a facility for an entire day without receiving services and were often charged fees for services greater than the price reported in the corresponding facility audit.

Much of the information shared in this paper is similar to other studies using the simulated client method, which found frequent implementation of menstrual requirements[21] and disrespectful treatment by providers.[22,27,28] Some informal information volunteered by the simulated clients, such as the garnering of informal fees and waiting most of the day at a facility without receiving any services, has not been seen in previous results from simulated client studies.

The implications of this study are that service quality deficiencies, medical barriers, and access issues related to provider availability and inappropriate client charges may limit clients' ability to obtain the family planning services for which they come to health facilities. In addition, women who are treated with disrespect and given misinformation may spread the word to others who might subsequently decide not to visit those facilities.

Regarding consistency of findings, there was no overall discernible pattern in the aspects of poor delivery across the participating facilities or providers. The facilities where providers were unfriendly or rude were not always the facilities where menstrual requirements were imposed or providers were absent. Notably, a facility in which a provider was twice characterized as encouraging and friendly by simulated clients was also 1 of the 5 facilities in which none of the providers engaged in collection of inappropriate client fees.

In considering the rights of clients to have access to high-quality family planning services, free of unnecessary medical barriers, it is important to first think carefully about the rights and needs of family planning service providers. The ability to provide services in a technically competent manner depends on adequate training, updated technical information, necessary equipment and supplies, and appropriate guidance.[35] Respectful treatment of clients and consistent accessibility can be better ensured by providers with a manageable workload, timely and adequate pay, and respectful workplace practices.[35] Efforts to better understand the perspective, needs, and motivations of the service providers are essential for identifying root causes of poor service quality and may help to address quality of care deficiencies and medical barriers identified in this paper. As other researchers have pointed out, findings from quality of care studies are not meant to "attack" providers, who are often "doing what they think best for their clients"[14]; therefore, studies designed to capture provider perspectives should be a priority in client-centered programs.

Programmatic Implications

Additional Training for Facility Staff

The disrespectful manner reported in the checklist appears widespread, while the shouting and unfounded suspicions were less commonly mentioned by the simulated clients. However, both the quantitative and qualitative information from simulated clients regarding their interactions with facility staff suggest the need for additional training in counseling skills to improve interactions with clients. Even those providers with an impressive knowledge base regarding a variety of available family planning methods may fail to meet the contraceptive needs of their clients if they are engaging with clients in a rude or dismissive manner.

Quantitative and qualitative information suggests the need for additional facility staff training in counseling skills to improve interactions with clients.

Use Tools Such as the Pregnancy Checklist

The presence of medical barriers may also impede client access to family planning methods. Requiring evidence of menstruation or requiring a pregnancy test before providing family planning is a common barrier. Those women who cannot afford a pregnancy test and must wait until their next menses to receive a method are at

risk of an unintended pregnancy in the interim. According to the World Health Organization, hormonal methods pose no medical danger to women or their pregnancy if accidentally used while pregnant (with the exception of the intrauterine device; this method should not be inserted during pregnancy).[36] Those providers wishing to be reasonably certain their client is not pregnant can use a simple job aid developed by FHI 360: the Pregnancy Checklist.[37] Training providers on consistent and proper use of the pregnancy checklist in facilities where pregnancy tests are not freely available has the potential to increase contraceptive uptake.[38]

Use of Accurate Information by Trained Personnel

The provision of misinformation to clients resulting from provider bias is another medical barrier to accessing family planning methods revealed in this study. The average delay in return to fertility for women using Depo-Provera is 9 months after their last injection.[39,40] Providers who mistakenly believe that average return to fertility for injectable contraception is 2 or more years may deny or discourage use of this highly effective method in younger, childless, or low-parity women. This study also revealed the possibility of unqualified staff members providing family planning counseling on occasions when the volume of clients could not be met by available providers. Such practices could potentially result in harm to the client if these staff members have not been trained in family planning provision.

Better Supervision

Improved supervision and oversight at facilities may increase physical and financial access to services.

It is important to ensure that providers arrive on time and are committed to providing services during the facility's posted hours of operation. It may be beneficial to reduce the number of legitimately competing priorities that pull providers away from their facilities during peak hours of service delivery. In addition, creating a more rigorous system of management and supervision may help to ensure that providers are not frequently away on personal business during working hours.

Transparent Fees

Future research investigating provider motivations may illuminate root causes of programmatic barriers.

Lastly, this study reveals an informal fee structure that suggests possibly corrupt behavior on the part of some providers, which could create financial barriers to contraceptive services, particularly among low-income clients. Forty percent of Kenyans currently live on less than US$2 per day.[41] Therefore, even a small informal fee of US$0.59 may constitute a significant portion of income for the average family planning client. The informal fee structure revealed in this study appears to be fairly widespread for OCPs among the facilities included in the study; implementing mechanisms such as receipt books or publicly displayed prices to help discourage corruption may lead to increased contraceptive use.

Limitations of This Study

The simulated client method allows the researcher to collect information on actual practice that would be difficult to obtain through other means. However, this method is not without limitations. First, there is the possibility of poor recall or subjective interpretation on the part of the simulated client. To address this concern, the 6 simulated clients who collected the data for this study participated in extensive training and pilot testing of their data collection instruments. All records and reports from each visit to a participating facility were submitted to the study's principal investigator on the same day as the visit, and opportunities for clarification or elucidation were provided as needed.

A second challenge with this methodology is the recruitment of simulated clients who realistically represent different sections of the population, including residents of areas with slum-like conditions. All 6 simulated clients were residents of Kisumu East District and resided in the catchment area of 1 or more of the facilities included in the study.

An additional limitation of the simulated client method is the 1-sided perspective of this approach to data collection. While the methodology allows for unobtrusive observation of provider performance, it does not consider the perspective of the provider or deficiencies in training, infrastructure, supervision or other general areas of support that may be lacking in the provider's work environment.[35]

Lastly, it is important to note that, given the design of the study, it is not possible to generalize these findings to all health care providers or facilities in Kisumu East District. However, many of the practices reported above are happening in 1 or more facilities and therefore warrant examination and further attention.

CONCLUSION

The simulated client method allows researchers to collect information on service delivery practices as

they occur naturally, in the absence of data collectors and research staff, and therefore can provide critical insights into aspects of care that may limit contraceptive use. Much of the quantitative and qualitative information supplied by the simulated clients in this study would have been difficult or impossible to collect via facility audits, third-party observations, or interviews with clients and staff. The results point to important issues around quality of care, medical barriers, and provider and financial access that may be impeding use of family planning services among potential clients. A larger and more systematic simulated client study would reveal whether some of the practices identified in this paper are widespread or isolated among a few providers or facilities. Increased training and heightened supervision of providers is one possible solution to these issues, as presented above in Programmatic Implications. However, a better understanding of provider needs and motivations will also be key to understanding the root causes of barriers to contraceptive use. Addressing these barriers not only has the potential to reduce maternal and infant mortality but also is an important step in safeguarding women's reproductive rights.

Acknowledgments: This research was supported by a grant awarded to the Carolina Population Center (CPC) at the University of North Carolina at Chapel Hill by the Bill & Melinda Gates Foundation. We are grateful to CPC (R24 HD050924) for general support. This research was also supported by a grant to Katherine Tumlinson from the American Psychological Foundation (APF). The contents of this article are solely the responsibility of the authors and do not necessarily represent the official views of CPC, the Gates Foundation, or APF.

Competing Interests: None declared.

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Peer Reviewed

Received: 2013 May 22; **Accepted:** 2013 Jul 20; **First Published Online:** 2013 Oct 14

Cite this article as: Tumlinson K, Speizer IS, Archer LH, Behets F. Simulated clients reveal factors that may limit contraceptive use in Kisumu, Kenya. Glob Health Sci Pract. 2013;1(3):407-416. http://dx.doi.org/10.9745/GHSP-D-13-00075

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ORIGINAL ARTICLE

Factors limiting immunization coverage in urban Dili, Timor-Leste

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Simple access to immunization services does not necessarily translate into uptake of services. In Timor-Leste, key determinants of the success of vaccination efforts are health workers' attitudes, the manner in which patients are treated, aspects of service organization, adequate supply of vaccines, and caregivers' basic knowledge about immunization.

ABSTRACT

Background: Timor-Leste's immunization coverage is among the poorest in Asia. The 2009/2010 Demographic and Health Survey found that complete vaccination coverage in urban areas, at 47.7%, was lower than in rural areas, at 54.1%. The city of Dili, the capital of Timor-Leste, had even lower coverage (43.4%) than the national urban average.

Objective: To better understand the service- and user-related factors that account for low vaccination coverage in urban Dili, despite high literacy rates and relatively good access to immunization services and communication media.

Methods: A mixed-methods (mainly qualitative) study, conducted in 5 urban sub-districts of Dili, involved in-depth interviews with18 Ministry of Health staff and 6 community leaders, 83 observations of immunization encounters, 37 exit interviews with infants' caregivers at 11 vaccination sites, and 11 focus group discussions with 70 caregivers of vaccination-eligible children ages 6 to 23 months.

Results: The main reasons for low vaccination rates in urban Dili included caregivers' knowledge, attitudes, and perceptions as well as barriers at immunization service sites. Other important factors were access to services and information, particularly in the city periphery, health workers' attitudes and practices, caregivers' fears of side effects, conflicting priorities, large family size, lack of support from husbands and paternal grandmothers, and seasonal migration.

Conclusion: Good access to health facilities or health services does not necessarily translate into uptake of immunization services. The reasons are complex and multifaceted but in general relate to the health services' insufficient understanding of and attention to their clients' needs. Almost all families in Dili would be motivated to have their children immunized if services were convenient, reliable, friendly, and informative.

BACKGROUND

The Democratic Republic of Timor-Leste is one of the world's newest nations. A former Portuguese colony, Timor-Leste was occupied by Indonesia in 1975 and restored to independence on May 20, 2002.

Timor-Leste's health and development indicators, including immunization coverage, are among the poorest in Asia. The 2009/2010 Demographic and Health Survey found immunization coverage for Timor-Leste to be 66.7% for DTP3 (third dose of diphtheria, pertussis, and tetanus vaccine) and 68.2% for measles. In 7 of the total 13 districts, BCG (bacillus Calmette–Guérin) coverage was less than 85%. Nationally, 22.7% of 1-year olds in Timor-Leste had never received any vaccination. Complete vaccination coverage was lower in the urban areas (47.7%) than in rural areas (54.1%). Dili, the capital city of Timor-Leste, had an even lower rate of complete vaccination coverage, at 43.4%, than the average urban coverage.[1]

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Timor-Leste is one of the world's newest nations. Its health and development indicators, including immunization coverage, are among the poorest in Asia.

Dili district has 6 sub-districts and 31 villages/*sucos* (administrative sub-divisions). Atauro, the only rural sub-district, is an island approximately 30 kilometers off the coast of Dili town.[2] Dili has come to have the largest urban concentration in Timor-Leste due to rapid in-migration since independence.[3] The report of the 2010 Timor-Leste Population Census noted that 21.9 % of the country's population lives in the district of Dili, most of them in urban areas.[2] The Timor-Leste Survey of Living Standards (2007) found that the urban population of the country has better housing, easier access to hospitals and clinics, schools and public transportation, and higher education levels.[4]

Vaccination coverage rates in urban areas are puzzlingly, often unaccountably, lower than rates in rural areas.

Timor-Leste's Ministry of Health (MOH) operates at 4 levels—central, district, sub-district, and community. Services are provided at a national hospital in Dili, 5 referral hospitals, 67 community health centers (CHCs) (1 in each sub-district), and 192 health posts (HPs) in different *sucos*.[5] In 2008 the SISCa (*Servisu Integradu da Saúde Communitária*), monthly integrated outreach sessions, were added to the system structure to provide every *suco* with access to integrated health services, including immunization.[6] Today, most immunizations are given at CHCs and during monthly SISCa sessions.

Besides the National Hospital in Dili, there are 5 CHCs, 9 HPs, 20 SISCa, and several private clinics.[7] The national hospital provides only birth doses of BCG and polio vaccines. The MOH has estimated that private clinics (for-profit and nonprofit) deliver one-fourth of basic health services, but few of them offer immunization services.[5]

Although the Expanded Programme on Immunization (EPI) has made significant progress in Timor-Leste since the country emerged from decades of turmoil in 1999, issues with immunization coverage and quality persist. Since 2008, the MOH has tried to improve the quality of immunization services through enhanced pre-service and refresher training and supportive supervision.[8] Despite these initiatives, several factors that hindered immunization coverage were recognized, including minimal community participation, vaccinators' lack of interpersonal communication skills, and deficient routine data recording and reporting to serve as a solid basis for District Health Services (DHS) to increase coverage.

As everywhere, a multitude of factors influence health care-seeking behavior in Timor-Leste. These include deeply rooted cultural beliefs and practices, levels of education and health knowledge, service accessibility, gender roles, and out-of-pocket expenses for clients. Although government health services are free, there are out-of-pocket expenses associated with transportation and loss of earnings. Also, most women in Timor-Leste depend on their husbands' income, and, therefore, the husband is the decision-maker.[9] Average walking time from households to the nearest health facility is about 70 minutes,[10] but the walk is much longer for some families. Particularly during the wet season, access to services in rural areas may be blocked by overflowing rivers and poor road conditions.

Because of its large population (234,026 in 2010),[2] Dili district contains more unvaccinated and partially vaccinated children than any other district in the country.[11] Since epidemics often start—or spread rapidly—in densely populated areas (as was the case with Timor-Leste's measles outbreak in 2011), it is important for children throughout Timor-Leste to raise coverage in Dili. Yet, as mentioned, despite good physical access to immunization services, vaccination coverage rates in urban areas are puzzlingly, often unaccountably, lower than rates in rural areas.[12]

The objective of this study was to identify the key factors that contribute to low immunization coverage in urban Dili. The findings were intended to help the Dili DHS and partners to devise effective and feasible solutions that would improve immunization services, reduce dropout rates, and increase coverage. The study sought to:

1. Determine deficiencies/insufficiencies within the health services that contribute to sub-optimal vaccination coverage
2. Better understand parents' knowledge, attitudes, and practices regarding vaccinations and the health system and how these may contribute to sub-optimal vaccination coverage
3. Recommend modifications to service availability, provider practices, community mobilization, and/or health promotion that could improve vaccination coverage

METHODS

Study Design

A cross-sectional, mixed-methodology study conducted in March and April 2012 combined qualitative (primarily) and quantitative methods, including observations, exit interviews, in-depth interviews, and focus group discussions.

Study Population and Sampling

A total of 83 immunization encounters were observed, and 37 exit interviews were conducted with caregivers. Observations and exit interviews took place at 11 sites (5 CHCs, 3 SISCa, 1 HP, 1 private clinic, and the national hospital). These sites included all CHCs in urban Dili, the only national hospital, and the largest private clinic that immunizes. The 3 SISCa were selected randomly, one each from high, medium, and low immunization coverage sub-areas. Researchers observed either up to 20 children vaccinated or for 60 minutes, whichever came first. Caregivers were selected for exit interviews randomly at each site after seen by health care providers.

We conducted 24 in-depth interviews with health staff members (11 vaccinators and 7 health facility directors) and community leaders (6 *suco* chiefs). Health staff members were randomly chosen from all 5 CHCs, the national hospital, and 1 private clinic. Community leaders also were selected randomly from each group of *sucos* with poor, average, and good immunization coverage.

Family members (mothers, fathers, and grandmothers) of children ages 6 to 23 months participated in focus group discussions. To determine eligibility by children's immunization status and type of caregivers, we screened these participants using a structured questionnaire and classified them into 3 groups:

- **No immunization:** Child had no immunizations at all.
- **Fully immunized:** Child had all of the immunizations that he/she was eligible for at his/her age.
- **Partially immunized:** Child had some, but not all, of the immunizations that he/she was eligible for at his/her age.

The 26 urban *sucos* were segmented by immunization coverage levels, and 11 *sucos* were randomly selected from these 26 for screening and selection of focus group discussion participants. These 11 *sucos* included 2 from the high-coverage category, 4 from the medium category, and 5 from the low-coverage category.

Participants were selected at random from a starting point in each selected neighborhood; each researcher went in opposite directions and screened every third household. The interviewer explained the study and asked eligible participants to provide verbal consent to participate voluntarily. In total, 70 randomly selected households were identified.

Table 1 reports details on the study sample. The only rural sub-district of Dili, Atauro, was excluded from the study population.

Observations

Using structured checklists, experienced and trained teams observed vaccination sessions. The observations focused on characteristics of caregivers, types of antigens offered, potential missed opportunities, and health workers' manner, counseling, and vaccination technique.

Exit Interviews

To learn the caregivers' perspectives on communication and their interactions with health care workers, the researchers conducted up to 5 exit interviews with caregivers selected randomly as

TABLE 1. Study Sample

Methodology and Types of Participants	No. of Participants
Observed Immunization Encounters	
Mothers	69
Fathers	3
Mothers and fathers together	4
Other caregivers	7
Subtotal	**83**
Exit Interviews	
Caregivers	37
Subtotal	**37**
In-Depth Interviews	
Health staff	18
Community leaders	6
Subtotal	**24**
Focus Group Discussions	
Mothers	52
Fathers	10
Grandmothers	8
Subtotal	**70**
TOTAL	**214**

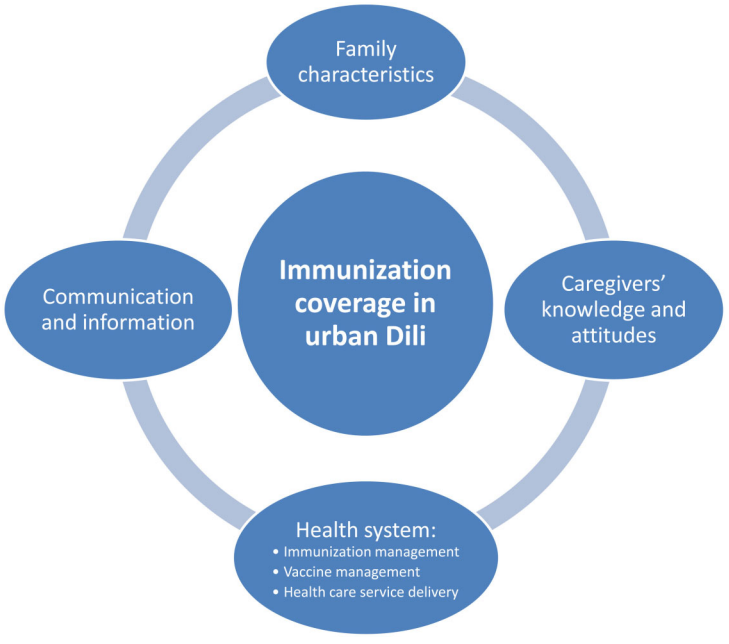
they were leaving each observed vaccination site. These interviews also allowed the interviewers to understand how well the caregivers remembered the information given to them.

The team used a semi-structured questionnaire that focused on waiting time, level of client satisfaction, what immunizations the child received, providers' communication and behavior toward clients, reasons for bringing the child, the return date for the next vaccination, and understanding of possible adverse events following immunization.

In-Depth Interviews With Health Staff

We used a semi-structured questionnaire to facilitate in-depth interviewers with health staff (vaccinators and health facility directors). Topics included, but were not limited to, perceptions, level of knowledge, suggestions on how immunization services can be improved, reasons that some children are not vaccinated, seasonal migration, role of the vaccinator in informing the community about services, understanding of the community's role in vaccination services, and MOH and DHS support.

FIGURE 1. Four Themes Associated With Immunization Coverage in Urban Dili, Timor-Leste



In-Depth Interviews With Community Leaders

Community leaders were interviewed using a semi-structured questionnaire to understand their perspective and their role in vaccination activities. We collected data on community demographics, leaders' role in the community and the health of the community, community challenges, relationship with government health services/systems, interaction with private health services, perceptions of childhood immunization, knowledge of immunization services in the community, and the role of community leaders in immunization services.

Focus Group Discussions

Focus groups ranged in size from 2 to 9 people, and the discussions lasted from 1 to 1.5 hours. We collected information on perceptions of immunizations, experiences with immunization services, reasons for current immunization status, and suggestions for how immunization services can be improved.

Data Analysis

For quantitative analysis, we entered data from observations and exit interviews into Microsoft Excel and conducted a simple descriptive frequency analysis.

Qualitative information collected through exit interviews, in-depth interviews, and focus group discussions was transcribed, translated into English, and analyzed using a manual coding system. The data analysis process followed a sequence of interrelated steps, such as reading, coding, displaying, summarization, and interpretation. After cross-checking for validity and credibility through daily meetings and discussions, the team identified 4 common themes: family characteristics, caregivers' knowledge and attitudes, the health system, and communication and information (Figure 1).[13]

Ethical Consideration

We obtained ethical clearance from the Essex Institutional Review Board, USA, and the Research and Development Cabinet of the MOH, Timor-Leste. Before data collection, we obtained verbal consent from the respondents.

RESULTS

Below, we present the results of focus group discussions, observations, exit interviews, and in-depth interviews.

Family and Socioeconomic Characteristics

Among the caregivers (N=70) who participated in focus groups, 33% had children/grandchildren with complete immunization, whereas 40% had partially immunized children/grandchildren, and 27% had children/grandchildren with no immunization (Figure 2).

Of the 52 mothers who participated in the focus group discussions, 50 were housewives, with families of up to 12 children. One mother studied at the university, and 1 worked as a public servant. Most of mothers had never attended school or had limited education (up to primary school). Most (n=46) had very temporary work in farming, small business, construction, and/or other manual labor.

Caregivers from more densely populated areas of Dili were found to have better access to information and communication from various sources, such as health facilities, neighbors, SISCa, media, and community leaders.

Many mothers, regardless of their socioeconomic status, remarked that they were willing to pay up to US$3.00 for transportation or US $30.00 for consultations in private clinics in order to get their children vaccinated or treated for illness. Caregivers said that 5 private clinics in Dili requested payment for vaccination, while government clinics provided free vaccination.

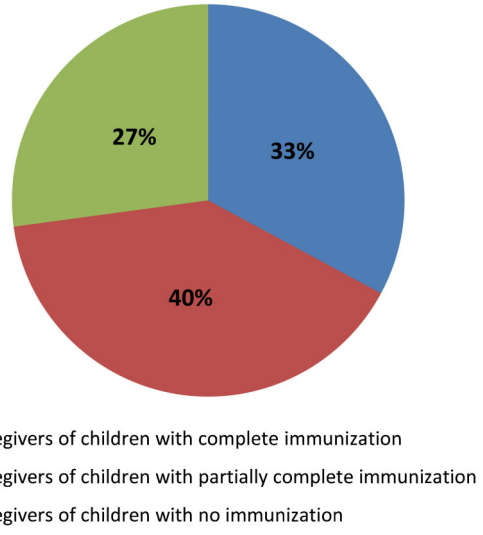
Caregivers are often too busy to take their children or grandchildren for immunization. For both employed and unemployed mothers, cultural gatherings, seasonal migration, and employment or domestic duties appear to have a higher priority than obtaining preventive health services. Many families move back to their home villages during the rainy season for agriculture purposes.

Analysis of health facility observations show that mothers (83%) were the most likely household member to take their children for immunization (Figure 3).

Caregivers' Knowledge and Attitudes

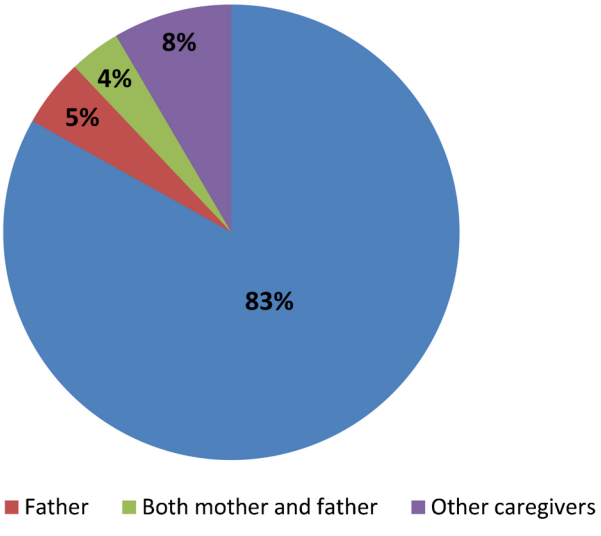
During the discussions, caregivers of fully immunized children were able to cite the benefits of immunization, although few could explain how vaccination works, and few were familiar with the vaccination schedule. Mothers of children who were fully immunized received more support (financial and moral) from their husbands and family members, and they were more likely to prioritize their children's health needs than mothers of children who were not immunized or

FIGURE 2. Immunization Status of Caregivers' Children



Among caregivers who participated in focus group discussions (N=70).

FIGURE 3. Relationship of Caregiver to Child Taken for Immunization



Based on analysis of health facility observations (N=83).

Caregivers with partial and unimmunized children often did not complete their children's vaccinations because of negative experiences with health care services.

partially immunized. Paternal grandmothers were very supportive of children's immunization and were often involved in the decision about when and where to seek services for immunization. Fathers were very unlikely to object to children being immunized.

Caregivers with partial and unimmunized children often did not complete their children's vaccinations because of negative experiences with health care services. One caregiver reported that one health care worker told her:

> *"It's better not to bring your child here (health facility). … Sometimes you [the caregiver] come regularly and sometimes you don't. … So it's better not to bring your child back again. …" We felt very bad.*

The quality of counseling was reasonable, although counseling fell short of what health staff members had been taught.

Those who had a bad experience with one child would not take other children for vaccination. A few mothers explained that they were shouted at when they came late or if they had lost their LISIO book (*Livrinho Saude Inan no Oan,* or Mother and Child Health Book). Some mothers were afraid of taking their children if they had missed an appointment and would rather avoid going back than face interrogation.

Others were discouraged to return for subsequent vaccinations after their children suffered from adverse events following immunization (such as fever, crying, or insomnia) or wasted a visit because the vaccine was not available. One father said in a focus group discussion:

> *I wanted to take my child. … My second and third child received immunization here. … And then my children got very high fever all day and night. … I was the one who was afraid.*

Other reasons that children were only partially immunized included caregivers not realizing that they needed to bring their children back for additional immunizations, child illnesses, and many mothers having job responsibilities.

Women who had delivered at home without a skilled birth attendant said they were scared of being shouted at by the health worker for birthing at home, so they did not seek treatment or vaccination for their children afterwards. Women who recalled having a negative experience during childbirth at a health facility were less likely to return to a health clinic for postnatal checkups or for vaccination.

Some caregivers of unimmunized children mentioned that they were reluctant to have their children vaccinated or that they lived too far from services to have their children vaccinated. A small number of caregivers thought that immunizations were harmful for their children, and they did not believe that vaccination could prevent diseases. Again, complications after previous vaccinations also contributed to low interest among these caregivers in having their children immunized. Table 2 summarizes the reasons for a child being fully, partially, or unimmunized.

Health Workers' Views, Attitudes, and Practices

During observations, health care workers appeared to be friendly and respectful to mothers and their children. Nearly all mothers (97%) during exit interviews said that they were satisfied with the services received, even though 43% had waited more than 30 minutes (Figure 4).

Vaccinators' counseling of clients was observed to be of reasonable quality, although it fell short of what health staff members were taught in training: 78% of clients received information on side effects; 89% were advised on when to return, but only 16% were invited to ask questions. These observations were consistent with responses from caregivers during exit interviews, in which most clients (62%) were able to explain the side effects (fever, swelling at the injection site, diarrhea); 81% could give the date for next immunization (for example, in 1 month); but 65% were unable to state the type and benefits of the vaccine administered to their children (Figure 5). Therefore, it seems, although health care workers provided some counseling for caregivers, the communication and information provided was frequently incomplete.

A caregiver said in a focus group discussion:

> *In reality and based on my experiences when I took my children for immunization … When they [health workers] finished vaccination, they have never explained what type of vaccine was given to my child and what was the benefit of vaccination. Was it vaccine-preventable diseases? They did not explain. They only vaccinated my child and just told me to come back next month. … That's it.*

This was highlighted in the discussions when caregivers said that they often misunderstood the schedule for future vaccinations, and as a result some children failed to complete the schedule.

Most health workers have multiple tasks in the clinic. Of the 18 health care workers interviewed, 9 were aware of immunization coverage, and 3 were aware of dropout rates for their health facilities. Half of them reported that they were not

TABLE 2. Reasons for Child Having Complete, Partial, and No Immunizations, Compiled From Focus Group Discussions

Sociocultural Factors	Fully Immunized	Partially Immunized	Not Immunized
Understand the benefits	✓	✓	
Motivated	✓		
Collaboration with husband	✓		
Conflicting priorities (working parents)		✓	
Afraid, shy		✓	
Misunderstood schedule and came late		✓	
Children got ill		✓	
Raining and distance		✓	
Bad experiences[a]		✓	✓
Perception that child is too weak for vaccination			✓
False beliefs that vaccination does not prevent diseases			✓
Lost health card or no card		✓	
Lack of interest or motivation			✓
Delivered at home			✓

[a] Includes fear of provider or of interrogation, adverse events, unavailable vaccine, and miscellaneous reasons.

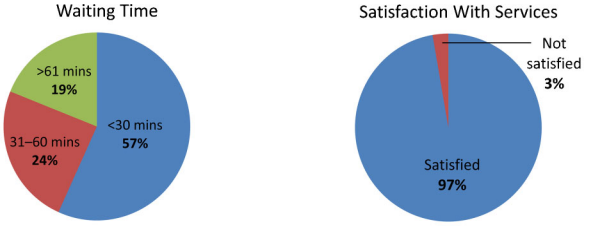
only providing immunization services at health facilities but also were involved in house-to-house screening and vaccination activities, outreach programs, and care for pregnant women. All 18 declared that their multi-task functions, in addition to the shortage of health workers, limited their ability to deliver better quality immunization services. Nevertheless, 13 said that they always provided counseling to the caregivers.

Service Provision

Health care workers said that there are not enough workers and transport for outreach activities, and they are not regularly updated as needed to provide an adequate standard of care.

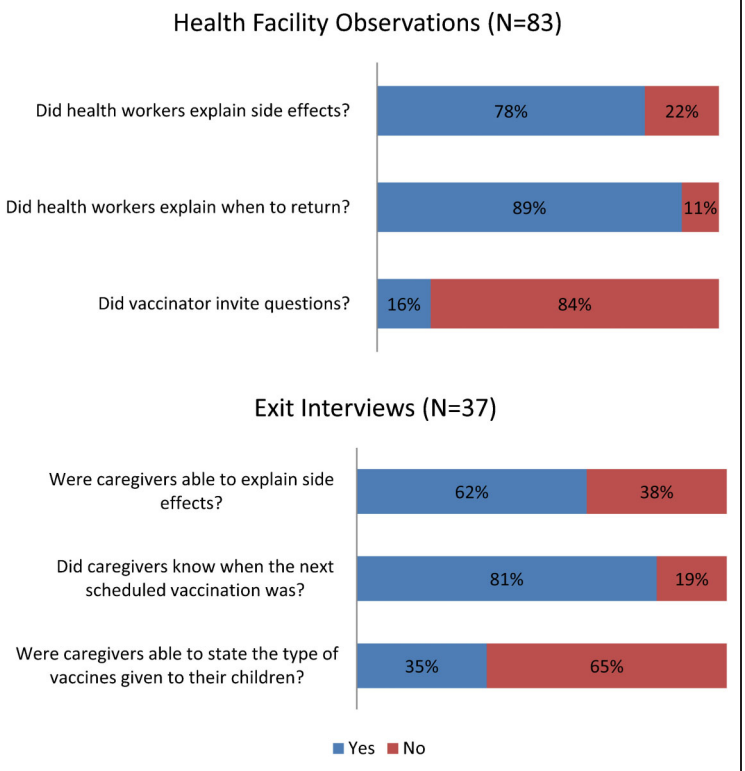
Interviews with health staff and facility directors found that many health facilities, particularly in harder-to-reach areas of Dili, lack a consistent schedule of vaccination sessions and of regular outreach sessions. Some health facilities offered only certain antigens on certain days of the week and/or limited the number of caregivers who could obtain any health care service during each morning or afternoon. Most of the participating health facilities would attend to a maximum of 50 patients in the morning and then reopen for vaccination and other health services in the afternoon. In spite of health clinics being open from 8 am to 5 pm, most patients are seen in the morning. Many health facilities offer BCG and measles vaccines only a few days per week to avoid vaccine wastage; for example, vaccinators do not want to open a 20-dose BCG vial for only a few children. In

FIGURE 4. Caregivers' Assessments of Waiting Times and Satisfaction With Services



Based on analysis of data from exit interviews (N=37).

FIGURE 5. Quality of Counseling and Health Education



observed sessions, 2 children who were ill but eligible to be vaccinated were refused vaccinations.

Health care workers claimed in the in-depth interviews that, when waiting children could not be vaccinated, they always encourage frustrated parents to bring their children back. Parents could be particularly frustrated if they had missed work, traveled long distances, spent money for transportation, and waited for a long time only to find that their child could not be vaccinated that day.

At observation sites, the study found that waiting time and venue (small, crowded, and dirty) were not issues for most caregivers as long as their children received the immunization.

Outreach programs had never reached some families in Dili.

Many discussion participants talked about difficult access to health services for families in areas further from facilities and with no outreach. Unexpectedly, the team found that outreach programs conducted by the MOH, such as SISCa, had never reached some families in Dili district. Even in Dili, geography and walking distance, especially during the rainy season, are barriers to bringing children to be vaccinated. Respondents, both community leaders and caregivers, expressed their wishes to have health programs and immunization more accessible to their community.

Health Information and Education

Most respondents in less densely populated areas of Dili (the city periphery and areas where people live on mountainsides) reported that they did not know where and when to obtain immunization information or services. This report is consistent with community leaders' views, which emphasized that some caregivers had inadequate information and communication about immunization services. Caregivers, in particular, think that information currently available is not sufficient.

This lack of practical information, added to a lack of accessibility, acceptability, and affordability of services in some parts of Dili, affects people's perceptions of the barriers and benefits of immunization and eventually discourages them from seeking vaccination. The main sources of information on immunization and support reported by the respondents were their peers, their own experiences, mass media, and print materials (such as pamphlets and posters).

DISCUSSION

Studies on the reasons for low immunization coverage from a variety of countries have identified such factors as inadequate immunization services, poor parental knowledge and attitudes, limited access to services, poor health staff attitudes and practices, unreliability of services, false contraindications, fears of side effects, conflicting priorities, and parental beliefs.[14–17]

Similarly, this study indicates that poor immunization coverage in Dili is related to multiple, complex, and interrelated factors, including inconsistent and irregular immunization sessions, lack of adequate outreach activities, and some health care workers' poor behavior toward clients, which leads mothers to fear being reprimanded. Underlying these factors is the health system's problems in providing adequate resources to facilities to conduct the full range of services, including integrated outreach services. User factors also contribute to low immunization coverage, including primary caregivers being busy with other obligations and

families' incomplete understanding of the benefits of vaccination.

The study found that caregivers' negative experiences at vaccination sites or with post-immunization side effects were among the most common factors that discouraged immunization. Such findings are commonly reported elsewhere.[18] While some research finds that caregivers who have a negative experience with health care workers are less likely to follow the vaccination schedule, this is not always the case.[18] In Dili, health care workers' attitudes and behavior toward clients appear to have a large influence over whether clients return.

Despite the national service standard that all vaccinations should be available at CHCs every day,[19] this study encountered limitations on the availability of immunization services. Facilities restricted certain antigens to certain days and limited the number of persons attended in a session. Frequent stockouts, too, appeared to lead to missed opportunities for vaccination and incomplete and delayed vaccination. Another study in Timor-Leste indicates that this situation occurs not only in Dili but also in other districts and is a major reason for limiting immunization coverage in the country.[20] Immunizations (all antigens) should be offered every day at all CHCs, as the MOH Basic Package of Health Services specifies.

Service availability and access are likely to be worse in the city periphery or less densely populated sub-areas or mountainous areas, where communities are sparse. Although perceptions of distance among urban caregivers in Dili are not clear, this issue appears to be related to immunization status. This finding is also seen in other studies. For example, a study in Bangladesh found that women who reported having a health facility nearby (<1 km) were more likely to fully immunize their children.[21] Another study, in India, found a positive association between the presence of a health center within 2 km of an urban slum and the immunization status of children.[22] Further studies are needed to understand the perception of caregivers of urban Dili about distance to immunization and other health services.

The lack of regular outreach activities or SISCa in urban Dili limited the uptake of services. Many mothers in Dili are working, at least in short-term jobs. Extended clinic hours for immunization would likely help these working mothers. Studies have found that extended hours can reduce dropouts and left-outs in urban areas.[16,23] In addition, making services more reliable, for example, by having regular stocks of vaccines, is crucial to ensuring the community's faith in service delivery.

Caregivers of fully immunized children had good basic knowledge and understanding of immunization. Studies show that knowledge gaps underlie low compliance with vaccination schedules.[24]

Seasonal migration to and from urban Dili is quite common and affects immunization coverage. Rural-urban migration—for example, where families move for better economic opportunities—has been shown to adversely affect use of health services, including immunization.[25] As people move from one community to another, they lose track of the time for vaccination, children are left with other caregivers, or parents forget the immunization records. This problem warrants further study in Timor-Leste. Tracking and reporting systems could be established for children who receive vaccines from sites other than their designated sites. These systems could trace these children for the subsequent vaccinations.

Health care workers' attitudes and behavior toward clients appear to influence clients' decisions to return for vaccination.

Paternal grandmothers in Dili were very supportive of immunization and were often involved in the decision about when and where to seek service for immunization. As in many other countries in South Asia,[15] mothers may play a subsidiary role to the paternal grandparents in decision-making on seeking immunization services for children. Mothers need both financial and moral support from their husbands to avail their children of immunization services.

Paternal grandmothers—key decision-makers in families—were supportive of immunization.

Limitations

We used a variety of qualitative methods to obtain an in-depth understanding of the determinants of under-immunization and to enable triangulation of findings from different informants and situations (for example, mothers in exit interviews and mothers in focus group discussions; heath care workers and mothers). Data from observation and exit interviews enable some frequency analysis quantitatively, but it does not permit statistical testing.

Discussion group participants were from poor and middle-income families. Thus, the beliefs and attitudes of rich families are missing from the study findings. The research team's presence probably encouraged the health care workers being observed to be friendly and respectful to mothers and children, a bias known as the Hawthorne effect.[26] Information from focus

group discussions, where many mothers claimed to have been humiliated by vaccinators, painted quite a different picture.

Recommendation for the MOH and the Dili DHS

EPI service hours should be extended. Moreover, Dili needs more outreach sessions.

This study supports the recommendation that EPI service hours should be extended.[27] Moreover, Dili needs more outreach sessions. These could be organized at schools, through night clinics, and after church on Sundays or at other times. In order to maximize service delivery and optimize use of limited resources, these outreach efforts could integrate other maternal and child services as well. Health facilities should, according to MOH standards, provide immunization services every day that the facilities are open. The MOH needs to ensure an uninterrupted supply of vaccines and associated supplies around the year. Currently, health services do little to promote vaccination or to engage with community leaders and networks.

To improve coverage, the district health services and the MOH would benefit from taking steps to improve health care workers' attitudes and practices toward clients and to expand mobilization activities. These improvements may require a combination of training, including sensitization aimed at changing attitudes, supportive supervision, steps to reduce the flood of clients at certain times of the day, and adding additional staff. Improved health care worker communication can help caregivers understand what vaccinations their child has received and should receive in the future, and can reduce anxiety about side effects. Health care workers should focus on explaining to parents that some side effects are normal, that simple treatment methods are available, and that these side effects mean that the vaccination is working.

EPI microplanning was just beginning in Dili at the time of this study. Microplanning at the sub-district level should be organized regularly and include community leaders, health care workers, volunteers, and civil society organizations. The national and district immunization programs need to support Dili's sub-districts in communicating better about vaccination—their importance, safety, and the basic schedule.

CONCLUSIONS

Good access to health facilities or health services does not necessarily translate to uptake of services, and this is as true for immunization as for any other preventive service. This study found that in Dili district, health care workers' attitudes, the way that health care workers behave with clients, and convenient (client-centered) provision of immunization services are extremely important to maintaining caregivers' motivation to fully immunize their children. We also found that a basic understanding of immunization, such as its general purpose and the need for several visits, is a key factor in the completion of all vaccinations for infants. In addition to these generally expected factors affecting uptake of immunization services, we also discovered some unexpected findings, including the lack of outreach and health education in Dili, grandmothers' role in decision-making, caregivers' perceptions and beliefs, and seasonal migration. The reasons that children are not fully vaccinated are complex and multifaceted, and so the solutions must be, also.

Acknowledgments: The team wishes to express sincere appreciation to the Imunizasaun Proteje Labarik (IPL) project staff, to institutional supporters (Millennium Challenge Corporation [MCC], the U.S. Agency for International Development [USAID], and John Snow, Inc.), and to data collectors for their invaluable time and effort in carrying out this study. We would also like to acknowledge the health care workers, caregivers, and community leaders for their hospitality and willingness to share their experiences, beliefs, and opinions. Finally, the team extends its appreciation to the personnel of the Ministry of Health (MOH), the Dili District Health Services (DHS), and the Expanded Programme on Immunization for their contributions to the study. This study was conducted with the full cooperation and engagement of the MOH and the Dili DHS. The MOH was consulted during development of the research proposal and data collection and has actively participated in disseminating the study findings.
The IPL program is funded by MCC through USAID to support the MOH in Timor-Leste. The program is managed by the Maternal and Child Health Integrated Program (MCHIP) through John Snow, Inc. under Cooperative Agreement # GHS-A-00-08-00002-000.This study was made possible by the generous support of the American people through USAID and MCC. The contents of this paper are the responsibility of the authors and do not necessarily reflect the views of USAID, MCC, or the U.S. Government.

Competing Interests: None declared.

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Peer Reviewed

Received: 2013 Aug 2; **Accepted:** 2013 Oct 10

Cite this article as: Amin R, de Oliveira TJCR, Da Cunha M, Brown TW, Favin M, Cappelier K. Factors limiting immunization coverage in urban Dili, Timor-Leste. Glob Health Sci Pract. 2013;1(3):417-427. http://dx.doi.org/10.9745/GHSP-D-13-00115

GLOBAL HEALTH: SCIENCE AND PRACTICE
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INNOVATION

Dedicated inserter facilitates immediate postpartum IUD insertion

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A specially designed inserter aims at facilitating IUD insertion within 10 minutes to 48 hours after delivery during the postpartum period when demand for, and health benefits of, contraception are high.

Short birth-to-pregnancy intervals are associated with poor perinatal and maternal health outcomes.[1–4] Recent data point to a high level of unmet need for family planning among women in the first year following delivery.[5] Improving access to family planning information and a range of contraceptive choices immediately following delivery can result in higher contraceptive uptake and help address unmet need among women who might not otherwise access such services.

Immediate postpartum intrauterine device (PPIUD) insertions within 10 minutes to 48 hours after delivery can reduce barriers to postpartum contraceptive use by offering women a highly effective, safe family planning method when it is most convenient to them.

A dedicated PPIUD inserter is currently not available. As a workaround, providers use IUDs packaged for interval insertions (insertions performed postabortion or any time after 6 weeks postpartum), which requires them to remove the IUD from the inserter sleeve with forceps before placing it at the uterine fundus. However, appropriate forceps may not always be available, and a series of specialized maneuvers are required for this insertion technique. Further, the string used in conventional IUD inserters is too short to be visible after PPIUD insertion.

Population Services International (PSI), in collaboration with the Stanford Program for International Reproductive Education and Services (SPIRES) and Pregna International Ltd., has created a simple, inexpensive inserter designed specifically for PPIUDs (see Figure).

The new inserter:

- Eliminates the need for specialized instruments such as forceps and allows for a standardized, easy-to-learn technique that mimics interval insertion
- Is made from sturdy yet bendable plastic that can accommodate the shape of the postpartum uterus
- Comes preloaded in the insertion sleeve so there is no need for manipulation, thereby reducing the opportunity for contamination and infection
- Does not require the provider to put his or her hand in the woman's vagina to insert the IUD, further reducing infection risk
- Has a longer insertion sleeve to ensure that the IUD can reach the fundus easily
- Has a longer string that is visible following a postpartum insertion
- As a dedicated product, could improve acceptability among providers of postpartum IUD provision

With seed funding from "Saving Lives at Birth: A Grand Challenge for Development," PSI will collaborate with the Federation of Obstetric and Gynaecological Societies of India and SPIRES to conduct a proof-of-concept study followed by a clinical trial in 2 public-sector hospitals in India. The study will explore acceptability of the new inserter (provider/consumer comfort, satisfaction, and confidence), convenience, expulsion rates, and the training time required to achieve provider competency. Pregna International will provide the IUD inserters free-of-charge for the study.

For more information about the PPIUD inserter, visit the Postpartum Family Planning Toolkit at http://www.k4health.org/toolkits/ppfp.

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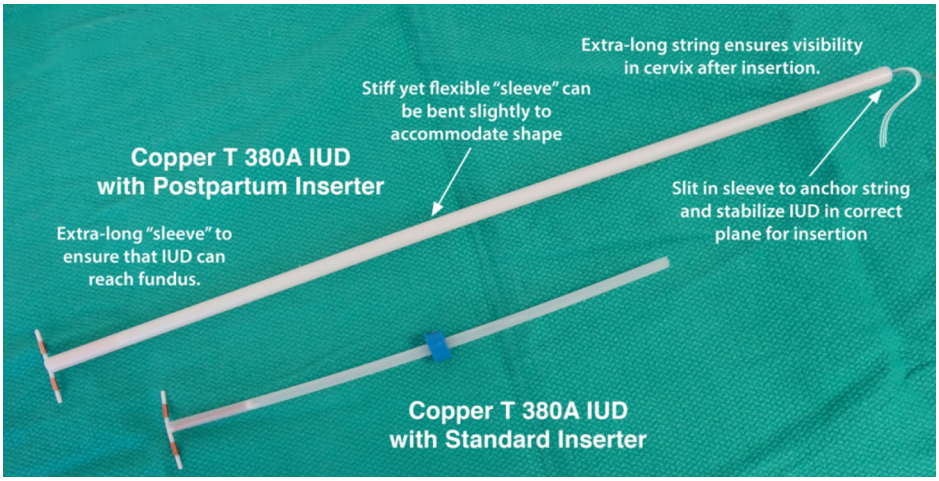
FIGURE. Characteristics of the New Postpartum IUD Inserter



Acknowledgments: Seed funding provided by Saving Lives at Birth: A Grand Challenge for Development.

Competing Interests: None declared.

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Received: 2013 Aug 27; **Accepted:** 2013 Oct 18

Cite this article as: Blumenthal PD, Eber M, Vajpayi J. Dedicated inserter facilitates immediate postpartum IUD insertion. Glob Health Sci Pract. 2013;1(3):428-429. http://dx.doi.org/10.9745/GHSP-D-13-00151

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