NAHEED AHMED
Johns Hopkins Center for Communication Programs, Johns Hopkins Bloomberg School of Public Health
RUPALI J. LIMAYE
Johns Hopkins Center for Communication Programs, Johns Hopkins Bloomberg School of Public Health
SARAH V. HARLAN
Johns Hopkins Center for Communication Programs, Johns Hopkins Bloomberg School of Public Health

A multilevel approach to knowledge sharing:

Improving health services for families and children

Improving health services for families and children requires a multilevel approach, involving engagement with government agencies, implementing partners, and service providers to ensure the success of health interventions. The Knowledge for Health (K4Health) project uses a knowledge sharing and capacity building approach to improving health services, including family planning and sexual and reproductive health (FP/SRH). In order for current technical information on FP/SRH to reach policy makers, program managers, and service providers—from doctors and nurses working in health facilities to community health workers making home visits—K4Health first uses participatory methods to assess the health information needs of these key stakeholders, to ensure that interventions meet their specific needs. Using the needs assessment results, FP/SRH information is then tailored and packaged for each audience to influence decision making at the policy level, or improve counseling at the point of care, so that community members are able to make informed health decisions for their families. K4Health collaborates with local government agencies, engaging them in designing, implementing, and evaluating interventions, in order to facilitate ownership and sustained interest in the program. Through an illustrative example from a field project in Malawi, this article examines how knowledge management projects can and should engage with all stakeholders involved in FP/SRH, as by doing so, the impact of these programs can enhance health services and health for families and children. [social knowledge management, digital health, community health workers, Malawi, sexual and reproductive health, social networks]

Introduction

Developing countries, now classified as low- and middle-income countries (LMIC), are countries that have developing economies. Families that live in these countries often lack proper access to health services, most notably those related to family planning and sexual and reproductive health (FP/SRH) (Alkema et al. 2013; Casterline and Sinding 2014; Cleland et al. 2011; Singh et al. 2010; WHO 2012). FP is often heralded as one of the greatest achievements in public health, due in part to its social, economic, and health benefits. FP can lead to smaller family sizes, longer birth intervals, reduced exposure to sexually transmitted infections, and fewer infant, child, and maternal deaths (Tsui et al. 2010). In fact, because many LMICs have high birth rates, FP has the potential to reduce poverty and hunger, and avert 32 percent of all maternal deaths and approximately 10 percent of all childhood deaths (Cleland et al. 2006). General sexual health education programs, which can address issues related to FP as well as HIV/AIDS, have the potential to increase the uptake of FP services and safer sex practices (see Kim et al. 1997; Kirby et al. 2007 for examples). Programs that seek to reduce risk of exposure to HIV/AIDS can greatly impact families and children. Because the HIV/AIDS epidemic primarily affects an individual's economic productivity, resulting in many children losing one or both of their parents, and infects unborn children due to mother-to-child transmission, programs that target health care workers can reduce transmission which, in turn, can improve the lives of families and children (Mishra and Assche 2008).

Limited access to FP/SRH services negatively impacts women and their families in a multitude of ways (Kuhlmann et al. 2010). Around the world, nearly 800 women die each day during pregnancy and childbirth (WHO 2012). In some regions, the situation is even more dire: for example, in Eastern and Southern Africa, close to 58,000 women died during pregnancy and childbirth in 2010 alone, which accounted for more than

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one-fifth of all maternal deaths globally (WHO et al. 2012). Further evidence shows that infants whose mothers die are far less likely to live to their second birthday than those whose mothers survive. Many of these deaths could be avoided with proper FP, which could decrease the rate of unintended pregnancies and lead to healthier families and children (WHO 2012). Thus, advocating for modern FP in LMICs is paramount. Informational campaigns to address unfavorable attitudes, quality information for providers and health care workers, and public policy are just a few of the components that can help move the FP agenda forward (Cleland et al. 2011).

Knowledge is paramount to improvement in the quality of health services, including FP/SRH health care. However, the mere presence of knowledge does not automatically translate to positive health outcomes (Ferris et al. 2001). Rather, knowledge must be shared, brokered, and thoughtfully managed—this is the essence of the process known as knowledge management (KM). KM includes the creation, acquisition, capture, sharing, and use of knowledge, skills, and expertise (Quinn et al. 1996). Practical needs for knowledge expertise and understanding have been present for millennia, and the KM field is rooted in religion, philosophy, psychology, economics, and business theory (Wiig 1999). Over the last three decades however, businesses (primarily in the for-profit sector) have transformed KM into a discipline that weaves people, processes, and technology together so that the knowledge necessary for an organization to succeed is systematically captured, created, shared, and leveraged for maximum benefit (Guptill 2005). From a management perspective, systematic KM typically includes facilitation and monitoring of knowledge-related activities; the creation and management of knowledge infrastructure; the renewing, organizing, and transferring of knowledge assets; and the leveraging of knowledge assets (Wiig 1997). Within the context of FP/SRH, KM has shown promise in enhancing the exchange and flow of the latest information and guidance among health professionals in Malawi and Ethiopia (Campbell et al. 2014; Harlan et al. 2013).

Existing literature on KM focuses on capturing, organizing, synthesizing, and retrieving information—a process through which the exchange of knowledge is passive. The literature is also dominated by research on ways that information technology can facilitate the acquisition, codification, and exploitation of knowledge (Newell et al. 2001). KM is constantly evolving and has gone through several generations. The first-generation KM focused on technology, codification, and maximizing efficiency, as much of this era sought to provide access to explicit knowledge, but paid minimal attention in noting how knowledge is generated (McElroy 2000). Second-generation KM moved the focus on capacity building and learning within organizations to maximize KM, as scholars began to recognize that despite its ability within many companies to successfully leverage knowledge, technology alone was not able to deliver comprehensive KM (McDermott 1999). The current generation of KM has shifted to KM practices far more interested in fundamentally people-focused approaches to capturing knowledge; methods include after-action reviews, peer assists, and knowledge cafés as avenues to increase knowledge exchange. These approaches suggest that such exchange relies ever more heavily on socialization, relationships, and cooperative interaction together, in a collaborative environment, indicating that these "social" facets must be front and center for effective KM (Janz and Prasarnphanich 2003).

Although the field is moving toward a people-focused perspective, this approach represents a relatively small proportion of KM inquiry (Aramburu and Sáenz 2007). In an ever-changing environment in which individuals interact across geographical regions, languages, and technical areas, KM must evolve to deal directly with the ways in which people and organizations create and utilize knowledge. It should also acknowledge the importance of the interactions among KM techniques, technology, and people (Bhatt 2001).

The Knowledge for Health (K4Health) project, funded by the U.S. Agency for International Development (USAID), uses an approach known as "social knowledge management" (Social KM) to provide health professionals with the knowledge they need to provide accurate, comprehensive, and relevant health information to families and children to improve FP/SRH globally. Building upon past generations of KM, Social KM emphasizes the importance of social connections and interactions with the idea that such an approach can further the impact of health and development programs.

The phrase "social knowledge management" has been in use for nearly a decade, primarily in the business literature. Online tools are but one component of social KM, and in contrast to early KM efforts focused heavily on using information technology as a means to capture and store what people know and

emphasized IT investments. As Heidelberger (2009) outlines in a presentation on the topic, Social KM is the management of *social knowledge*, where social knowledge is knowledge shared by groups (e.g., communities of practice), can take place both within and across organizations, and aims for a social benefit. Our most important consideration is systematically *collecting* knowledge and *connecting* people to it so they can act effectively. In order to do so, both technology, relationships, and systematic processes should be leveraged as means to share and spread experiential knowledge. Human and organizational dynamics are easily the most complex aspect of Social KM, and therefore deserve significant attention and consideration when creating social KM interventions. Ultimately, Social KM is about shared learning across boundaries, where individuals and groups make use of a wide range of tools, perspectives, and theories that enable conversations and collaboration in order to achieve common goals, all of which takes into account complex social dynamics and working realities.

K4Health's Social KM approach places people at the center of the KM process. Our Social KM perspective begins with a simple premise: the central role that human psychology and behaviors play in all KM and exchange efforts. This approach manifests on many levels: at the individual level; within organizations, communities, and societies; and through formal, informal, explicit, tacit, surface, and complex systems, to name a few. As K4Health views human and social factors as critical to effective KM work, our conceptualization of Social KM highlights key "social" pillars of KM: social benefit and social systems, and the concept of social interaction—including social networks, social learning, social capital, and social media (Figure 1).

Our overarching use of the term Social KM is to distinguish the social benefit function, which in the case of K4Health relates to improvements in service delivery, health systems, health behaviors, and ultimately health outcomes. Similar to others, we also highlight the use of social media tools, which provide a platform for social interaction across distance and time. These tools allow health practitioners to discuss challenges, share successes, and grapple with complex design and implementation issues. It enables a bottom-up KM approach, which not only recognizes, but understands the critical voice and role that community members can potentially play within knowledge exchange, based on individual control over the information that is shared, in

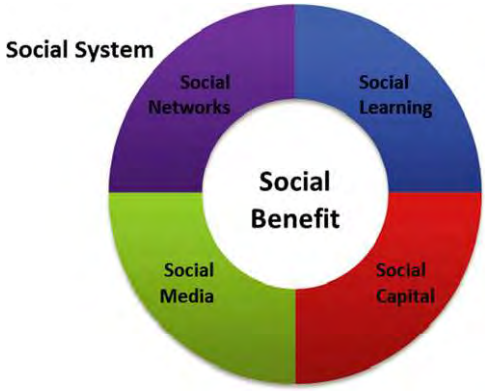

FIGURE 1. Pillars of Social KM.

contrast to more traditional KM approaches where a top-down approach is employed as a means to disseminate information (Avram 2006).

In addition, because Social KM employs principles and practices of KM for a social benefit, we recognize the need to pay special attention to other important "social" aspects of KM: social interaction, social networks, social learning, and social capital. The inclusion of these social interaction aspects, distinguishes our approach to Social KM from others. We emphasize that all of the "social" elements of our model take place within a social system, which Rogers (2003) defines as a set of interrelated units engaged in joint problem solving to accomplish a common goal. Members of a social system ranging from individuals to organizations to subsystems are joined together by a common objective. Understanding the larger system or subsystem can accelerate achievement of these goals (Rogers 2003).

The rate at which health and development outcomes can be achieved is influenced by social networks. Social KM is interested in studying network attributes, strengths, and weaknesses to actively increase and facilitate the flow of knowledge via targeted interventions, such as empowering identified social champions and removing bottlenecks. Networks also provide a space for social capital, defined as the "features of social organization, such as networks, norms and trust, that facilitate coordination and cooperation for mutual benefit" (Putnam 1993). The concept of social capital recognizes that in social networks, trust and norms can facilitate or hinder the progress of collective action toward health and development goals. Social cognitive theory defines human behavior as

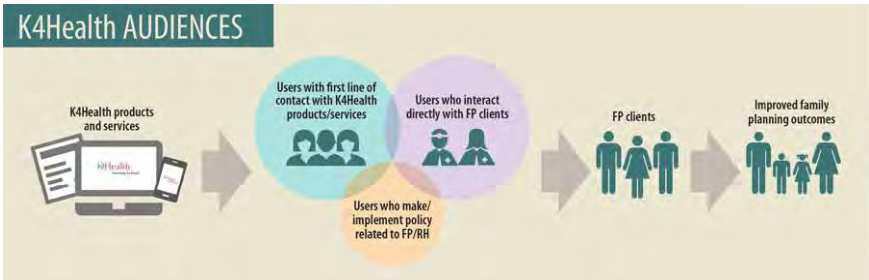

FIGURE 2. K4Health audiences and knowledge flow.

dynamic—consisting of reciprocal interaction of behavior, personal factors, and social factors—individual behavior shaped by social system and cognition, including expectations and beliefs, through social learning (Bandura 2001). From a KM perspective, individuals do not tap into KM systems simply to seek information. Rather, they engage in KM systems to meet like-minded individuals, seek support, and develop a sense of identity (Andrews 2002; Zhang and Hiltz 2003).

These Social KM pillars underlie and improve the traditional dimensions of KM, such as the processes to generate, capture, synthesize, exchange, and use knowledge; technology to support KM interventions; organizational systems to support a culture of KM; and key relationships that facilitate knowledge exchange. Our conceptualization of Social KM was informed by research findings and implementation experiences in a KM project we carried out in Malawi, which aimed to improve knowledge flows around FP/SRH and HIV/AIDS knowledge at multiple levels of the health system. This case study is discussed below.

With these Social KM pillars at the core, we consider four main audiences when designing activities to improve knowledge exchange related to FP/SRH (Figure 2): (1) direct users of our products and services (content as well as access to tools and expertise that can assist in delivering in a higher quality of health care service) (primary audience); (2) direct users of our products and services[1] who also interact with FP/SRH clients; (3) direct users of our products and services who are involved in making or implementing FP/SRH-related policies; and (4) clients themselves. Taken together, our products and services diffuse through these various audiences for improved FP/SRH outcomes. For example, we believe mothers are key decision makers in health-seeking behavior for their families, and our products and services equip mothers with the knowledge they need to make evidence-based decisions regarding their families' health.

Social KM and applied anthropology

The social pillars of our Social KM approach help ensure that our work is developed, implemented, and evaluated with people at the center. The Social KM approach, in fact, lends itself to a participatory process drawing upon key tenets of applied anthropology. An applied anthropological perspective involves collaborative research with local groups, who are viewed as partners and participants, with the overarching goal of using findings to advocate for and with these populations. The premise of applied anthropology is that communities have a right to be involved in their future and that while applied anthropologists can assist with advancing a community's well-being, anthropologists must be mindful of their role in the research, so as to not co-opt the community's agency (Rylko-Bauer et al. 2006; Singer 1994, 1995). K4Health reflects these values in how we ground our initiatives in the local context and work collaboratively with local partners. Drawing from applied anthropology, our participatory process involves engaging key stakeholders—including local government health agencies, local nongovernmental organizations (NGOs), and community members—to engage them in needs assessments, as well as the design and implementation of health interventions. As outlined in our Social KM approach, we have a bottom-up strategy, listening to what local actors want and need, and then working with them to make their vision a reality. We work with local partners to ensure they have a say in how interventions are designed, so that their community's needs are met and to nurture

ownership and interest in seeing the intervention succeed and continue. We adopt an applied anthropological lens in our work, in that we believe communities have a right to be involved in their future, hence the participation and close collaboration with local stakeholders in our field projects.

Determining the needs of clients, which is rarely taken into account when developing health programs, is necessary to ensure that women and families are receiving quality care and that services are client centered (Bogenschneider 2011). Ensuring that services are client centered requires not only surveying clients about their health needs but also acknowledging and drawing upon their expertise to finding solutions to health issues. Our fieldwork begins with a needs assessment, in which we not only hear from local actors, but also invite them to be present and engaged in analyzing the needs assessment data. In line with core applied anthropological principles, we use the needs assessment phase as a vehicle for engaging with and involving local communities from the beginning of the project and throughout the implementation and evaluation stages (Warry 1992). By working collaboratively with stakeholders, we ensure that communities have a voice in the design of the study and interpretation of study results and the development of recommendations for activities to address information gaps and needs identified in the assessment. Employing traditional ethnographic methods, such as participant-observation and embedding researchers in communities, is not feasible given the time and resource constraints of our project cycle, which has fixed dates and funds. In light of these limitations, we use a mixed-methods approach involving the collection of quantitative and qualitative data to obtain a comprehensive understanding of the underlying cultural and social norms in a community (Scrimshaw et al. 1991). Examples of methods we use include surveys, focus group discussions (FGDs), Net-Map,[2] and in-depth interviews. Our intention in using a variety of methodologies is to hear from relevant actors within a short amount of time, given our funding constraints. Our needs assessment findings are then shared with local partners, who review the results and work with us in designing interventions that address health service gaps, as we recognize they alone know what is best for their communities (Sillitoe 2007). In addition to assisting with the design and implementation of interventions, we also involve stakeholders in evaluating the impact of the projects, to gain their insights in interpreting results and brainstorming ideas to improve the project. As we simultaneously learn from local partners, we also exchange knowledge with them, in that we provide them with training on conducting research and project management. The exchange of knowledge is bidirectional, as we view local stakeholders as equal partners, who should be determining the development of their community.

Introduction to case study

We recognize that needs vary by context. As a result, the process we follow in implementing our work at the country level also varies. To better illustrate how we use a participatory process in our work, we will outline our experience from our Malawi field project. We drew on our experience from this project to inform our subsequent conceptualization of Social KM. The Malawi project was conducted in partnership with the Ministry of Health (MoH), and implemented through a K4Health partner office in Malawi, which led health programs and had a deep interest in improving FP and HIV/AIDS outcomes. This partner office had a history of working with the MoH on policy issues to improve health systems and quality.

Malawi case study

Background

Malawi, one of the poorest countries in the world, with approximately 50 percent of its population living below the poverty line, suffers from high morbidity and mortality rates associated with unintended pregnancy and HIV infection (Dunbar et al. 2013; World Bank [WB] 2014). The total fertility rate is 5.7 (WB 2012) and contraceptive use is almost 20 percent lower than the global prevalence rate (WHO 2014b). More than a quarter of reproductive age women have unmet FP needs, which can have a negative impact on families and children. However, increased contraceptive use can reduce maternal, infant, and child mortality and improve other perinatal and childhood health outcomes such as birth weight (Cleland et al. 2012). In addition, couples that practice FP and consequently have fewer children can invest more resources in each child, outcomes believed to benefit the family unit (Canning and Schultz 2012).

Furthermore, Malawi faces a generalized HIV/AIDS epidemic, with a 10.6 percent prevalence rate among those aged 15–49 (WHO 2013).

HIV is primarily transmitted heterosexually; however, children bear the brunt of the epidemic, with an estimated 910,000 children left orphaned from the loss of their parents and mother-to-child transmission accounting for 10 percent of all infections (UNAIDS 2013). Families that take care of orphans or other family members who have illnesses related to HIV/AIDS have less time for their own children and decreased family resources (Heymann and Kidman 2009). Complicating the health situation is a shortage of medical personnel, contributing to a weak and fragmented health system (Celletti et al. 2010; Haines et al. 2007; WHO 2014b). In response to the shortage of clinical providers, the health system has turned to community health workers (CHWs) to provide critical health services in underserved areas of the country. CHWs provide a spectrum of health services, ranging from HIV testing and counseling to vaccine administration (Hermann et al. 2009). These CHWs are a vital link to health services for people living in rural areas of the country, where 80 percent of the population resides (CIA 2014). As CHWs are often the frontline providers in rural communities, they require access to health information resources, so that their clients, including families and children, receive the best possible care. However, prior to a needs assessment conducted in 2009, little was known about how CHWs in Malawi seek and share health information, and barriers they face in accessing health resources (LeMay and Bocock 2012). CHWs provide information and counseling in a variety of health areas, they refer patients for treatment, deliver FP methods, and provide immunizations and growth monitoring to name a few tasks (Kadzandira and Chilowa, 2001).

The K4Health Malawi project process

In an effort to better understand and address these FP and HIV/AIDS issues, and the knowledge needs of health workers in Malawi, the project began with a needs assessment that included health practitioners working at multiple levels of the health system. The findings from the assessment were used to inform design and implementation of the K4Health Malawi Demonstration Project, which operated at the national level as well as at the district and community levels, in partnership with local stakeholders over an 18-month period from 2009 to 2011. At the district level, two districts received the intervention and a district with similar social and demographic characteristics served as a control. The goal of the project was to increase access to and use of FP and HIV/AIDS, thus increasing health care provider knowledge, strengthening the health system, and ultimately improving service quality.

A combination of methods was used for the needs assessment, which included Net-Map, FGDs, and in-depth interviews. Participants were purposively selected to cover multiple levels of the health system (national, district, and community), multiple roles within the health system (health program manager, health care provider), a variety of institutions (MoH, NGOs, clinics), and varying geographic areas (urban/rural). Net-Map group interviews were carried out at the national and district levels to determine the relationships, flow of information, and degree of influence among government, donor, and NGO stakeholders. For the development of these Net-Maps, we asked participants to identify HIV/AIDS and FP/SRH information that they perceived as particularly difficult to disseminate within the health system. The majority of participants selected FP generally and HIV/AIDS testing and counseling. These topics then served as the focus of the mapping exercise and results from the Net-Map interviews around these health topics revealed that FP and HIV/AIDS information is concentrated at the national level, and that the flow of health information is poor between the national and district levels. The diffusion of information was primarily top-down; and outgoing information from the community level to the higher levels of the health system was almost nonexistent. In addition to the Net-Map interviews, participants visualized information pathways and identified influencers within the health system. The Net-Map exercise also contributed to mobilizing stakeholders, as the group interviews brought different partners together to discuss issues and solutions to addressing challenges.

Once the needs assessment was completed, we convened key stakeholders to discuss the findings and explore possible solutions to addressing knowledge gaps and barriers to the diffusion of information within the health system. In consultation with stakeholders, several intervention activities were proposed, including the development of national level online toolkits, District Learning Centers (DLCs), and a SMS network[3] among CHWs at the community level.

The DLCs provided a physical space that offered access to online and offline health resources for health professionals in the region, in response to the needs assessment identifying limited Internet coverage and lack of print materials as barriers to learning and information seeking. The assessment also revealed that CHWs have difficulty

communicating with supervisors and their colleagues, leading to the design and implementation of the SMS network to increase communication and knowledge exchange. This SMS network allowed for two-way communication between users and the project covered the costs of messages. Stakeholders from the district and community remained engaged in the implementation process for interventions from their respective levels within the national health system. They determined what resources to include in the DLCs and were responsible for reviewing a list of frequently asked questions (FAQs) for the SMS network. Using a participatory process enabled health care providers at the district and community levels to create the KM system that ultimately led to service quality improvement.

Local partners actively participated in implementation and monitoring, which facilitated rapid course correction throughout implementation. For example, although CHWs were provided with mobile phones and received training to use them, actual use of the SMS network to request technical information was minimal. In collaboration with key stakeholders, we developed an electronic learning program in an effort to encourage greater use of the mobile phone network, through which CHWs received questions and tips on health topics, such as the advantages of using specific contraceptive methods. These tips were developed based on FAQs raised by the CHWs, current events (e.g., detecting/treating measles after an outbreak), and from interviews with supervisors. We collaboratively identified knowledge gaps through a question-and-answer approach with CHWs who subsequently participated in a learning process that prompted them to look for answers to technical questions in their training manuals and from each other. Examples of questions pushed out through the SMS network include the benefits of using certain contraceptive methods and the correct dosage instructions. This learning service encouraged greater use of the SMS network and technical information requests from CHWs to their supervisors. Evaluation of the project involved methods used during the needs assessment (Net-Map, FGDs, in-depth interviews), so as to provide baseline and endline comparison data.

We also carried out an assessment of the SMS network, involving analysis of the number and content of SMS messages. Findings from the endline Net-Map interviews indicated that there was an increase in outgoing communication from CHWs to higher levels of the health system in comparison to baseline. There was also greater information diffusion throughout all levels of the health system. A benefit of the SMS network was the identification of outbreaks, which led to district health officers rapidly responding to a meningitis outbreak based on a SMS message from a CHW. Evaluation results were positive. We found that our intervention widened service coverage (with the average number of clients visited per CHW per month at 74 in the intervention districts as opposed to 30 in the control districts), decreased the time CHWs reported stockouts (three minutes in the intervention districts as opposed to 8.7 hours in the control districts), and decreased the amount of time CHWs had to wait to receive feedback from a technical support person (nine minutes in the intervention districts and 25 hours in the control districts). We also found that our intervention resulted in a fourfold reduction in cost with regards to reaching supervisors ($0.48 in the intervention districts compared to $3.06 in the control districts).

Malawi project limitations

While the Malawi project achieved impressive results at the district and community levels, a post-sustainability assessment showed that many of the elements of the project were not sustainable. Computers housed at the DLCs had viruses and the government failed to provide cell minutes for CHWs after the project ended. We chose cell phones as the lowest low-tech option due to their ubiquitous use in the country. Despite these limitations, elements of the project did carry on. CHWs continued to communicate with each other to exchange knowledge using their own funds for the cell phones as mobile phone communication proved to be more efficient and cost effective compared with biking up to 30 kilometers to seek information from a supervisor. And even when the SMS network hub (the mechanism through which SMS messages were filtered at the District Hospital level) broke down, CHWs would use their personal funds to connect with their supervisors to solve problems, pointing to one valuable outcome of the project: CHWs became empowered to seek and apply knowledge through the project process. If this project were to be replicated in the future, lessons learned from this experience indicate that there is a need to more systematically plan for and foster local ownership of the project by the MoH in order to sustain the program.

Clients were interviewed to determine the effectiveness of the project and its impact on their

behaviors, but because the objectives of the project were to strengthen the health system workforce, the findings center on health system performance. Moving forward, we will involve clients from the beginning of projects, including the design and evaluation of the intervention.

Conclusion

The Malawi project placed health care providers, their motivations, and their commitment at the center of activities. The participatory approach we used took stakeholder participation into account during the needs assessment and implementation stages of the project. We based the project design on both the gaps identified in the needs assessment and through a participatory process with stakeholders, identified concrete activities to achieve their needs. By increasing access to and use of information around FP and HIV/AIDS counseling, we saw several improvements in the health system—more timely detection and prevention of stockouts, increase efficiency of referrals, increase in the average number of clients visited per month, more timely communication between CHWs and their supervisors and those with technical expertise—which will likely translate into improvements in health behaviors (greater adoption of contraception) that will improve the lives of families and children. As previously stated, because SRH information is paramount to reducing morbidity and mortality among families and children, increasing access to information related to sexual and reproductive and health should theoretically impact contraceptive use and safer sex behaviors in a positive manner. While we did not collect data that links exposure to our intervention to contraceptive or safer sex behaviors, we do know that your intervention positively impacted intermediate variables that, in turn, impact health behaviors.

Discussion

Engaging with a wide variety of stakeholders, including donors, governments, NGOs, CHWs, and civil society organizations, was a crucial part of working effectively in the research context described here. The authors learned from their experience with K4Health that engagement was important not only at the outset, but throughout every step of the work. While working hand in hand with diverse stakeholders can be time consuming and unpredictable, it is essential for responding to identified needs and working to ensure project sustainability. This approach can also inform policy and service delivery practices, as results were shared throughout the country with the aim of enabling CHWs to obtain the knowledge they need to improve service quality. Further, this work has the potential to transform the way information is shared among communities, and to help create a supportive policy environment for changes in the public health system to facilitate such sharing.

Our participatory process lent itself to an iterative and tailored approach to FP/SRH, with the goal of providing families with the knowledge they need to make informed, evidence-based decisions regarding their family's health (Bogenschneider 2011). And by engaging stakeholders at multiple levels of the health system, we use a multilevel approach to health care that meets the knowledge needs of health workers and encourages policy makers to address gaps within the health system.

For example, the Malawi needs assessment confirmed previous studies identifying CHWs as frontline providers in underserved areas, underscoring the importance of ensuring CHWs have direct communication with colleagues and access to health information (Herman et al. 2009). The SMS network we designed and implemented hand in hand with CHWs was a gateway for CHWs to become participants in the knowledge exchange system of Malawi. Instead of being only occasional recipients of information from the district level, CHWs became initiators of information flows through their messages reporting supply shortages and clinical questions, and gave them ownership of health counseling processes in their community. This is perhaps the greatest legacy of the project in a predominantly rural country where CHWs serve as a crucial health link for their clients.

Our previous experiences from several field projects, including our work in Malawi outlined in this paper, informed our conceptualization of Social KM. The foundation of our Social KM work is the idea that KM will be used for social benefit—in this case, applying KM approaches to strengthen the CHW response, and within this idea, ensuring that people are the center of our work. For example, using participatory methods to design the project allowed us to see the demonstrated benefit of placing people at the center of project planning as well as evaluation, and all project activities flowed from this ideal.

Regarding social interaction, the more we learned from the CHWs we engaged with, the more

we recognized that existing KM models did not adequately consider the social systems in which knowledge sharing occurs. As such, our fieldwork makes it very clear to us that the provision of health requires the cooperation of many different actors to solve a common goal, and because of this, the importance of social networks, social capital, and social learning cannot be ignored. Because health work is inherently implemented by many entities, not understanding and taking advantage of the social networks occurring within these multiple entities would be remiss. The Malawi project helped us realize that a better explication of these networks would inform how knowledge is shared. The project assisted in solidifying the identity of CHWs, which in turn led to increased knowledge sharing as conduits of health information. This project also helped us come to the realization that diffusion of best practices touches upon distal networks, and the information contained within these distal networks is critical with regard to knowledge generation and exchange. For example, CHWs are a key component of information and counseling in the health system that were not in the baseline Net-Map, yet CHWs are frontline health workers at the community level. In line with social networks, because of resource constraints, this work alerted us to the importance of social capital, and our recognition that there is a need to fully conceptualize how health professionals rely upon others to achieve their goals. For example, in Malawi, because not every CHW has access to technology such as a mobile phone, we learned that many CHWs were relying upon a few CHWs in their communities to relay important and relevant information regarding the administration of care. Finally, along these same lines, we learned that in the face of limited training and education, many CHWs were modeling behaviors of other, more experienced CHWs to make health decisions, suggesting that social learning is a crucial factor in the provision of health care.

Underlying our work in Malawi were key principles of applied anthropology—namely our stance of viewing local stakeholders as equal partners, with whom we collaboratively worked for and with to design and implement the project. We recognize the importance of not just working with local partners, but listening to them, so that interventions are designed with their insights and needs in mind, with the overarching goal of engendering a sense of ownership and trust in our efforts to help them. Using participatory methods, such as Net-Maps, we learn from stakeholders and bring together local actors for the purpose of ensuring relevant parties are involved and have a space to share to their insights. By working to facilitate ownership of the intervention among local stakeholders, we hope to ensure the sustainability of our work, as our involvement is limited by the project funding cycle. However, sustainability is an issue we struggle with, as seen in Malawi, and by learning from our experiences and refining our participatory approach, we continue to work to increase the longevity of interventions. Our experience in Malawi indicates to us that we need to more explicitly identify the ways in which applied anthropology can strengthen our work. Because our work seeks to meet the information needs of health professionals, we must be more deliberate in our engagement with them to ensure that their voices lead the work and so that they can take true ownership of the work.

Conclusion

The health needs of families and children are complex. Within the context of LMIC, children are disproportionately affected and infected with infectious diseases such as HIV/AIDS, and many women have unmet FP needs. However, to improve the health outcomes of families and children, health professionals within the health care systems play a critical role. Developing effective global health programming to improve the lives of families and children therefore requires input from families and individuals working within the health system. These programs require a true partnership among these audiences as well as program developers/implementers. To accomplish a genuine partnership, each of these audiences must be perceived and recognized as a part of the solution, and be involved and empowered in every step of the program process—from formative research to design, mobilization, implementation, and evaluation. Such a partnership has the power to improve the health outcomes of families and children, which, in turn, can lead to healthier communities.

Notes

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1. K4Health's products and services are composed of Toolkits (electronic libraries on specific health topics), eLearning courses (free online courses and certificate tracks for health professionals that are self-paced), POPLINE (only online database of FP and RH articles, including gray literature, that are free for users in LMICs), Photoshare (free online database of health photos for use by health professionals), and technical assistance around building KM skills and systems.

2. A Net-Map combines the visual aspects of creating a map with an interview. Created either by individuals or groups, respondents work with interviewers to address a key question and create a network map of actors related to the question/topic of inquiry. Through this process, the group determines influential actors, examines links between them, discusses influence, and determines next steps for addressing barriers and challenges (Schiffer and Hauck 2010).

3. The expanded access to modern communication technologies has given rise to the concept of "mobile health" (mHealth), which is the use of mobile phones for health improvement. Mobile phones can benefit providers specifically by helping overcome resource limitations.

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