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Mapping networks to improve knowledge exchange among family planning and reproductive health organizations in Ethiopia

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Despite recent progress, Ethiopia's fertility rate is 4.8 and maternal mortality ratio is 673/100,000. These poor family planning/reproductive health (FP/RH) indicators are due in part to inadequate systems for social knowledge management (SKM). The Knowledge for Health Project conducted qualitative research to identify: 1) key FP/RH actors; 2) SKM barriers/facilitators; and 3) opportunities to leverage networks and resources to improve uptake of evidence and best practices. Researchers conducted Network-Mapping exercises, interviews, and focus group discussions among 41 national, regional, and zonal/*woreda* stakeholders in Ethiopia. Participants identified FP/RH actors, and discussed each actor's relative influence and role in enabling/impeding knowledge exchange. They assessed health information needs and challenges, and made recommendations for improvement. Over 100 actors were identified. The Ministry of Health is central to information flow, and new knowledge often diffuses slowly to others. Needs differ by level: National-level professionals need policy and strategy documents, while regional- and community-level professionals request contextualized information. This innovative, participatory methodology facilitated a thorough examination of Ethiopia's FP/RH knowledge exchange network and allowed stakeholders to make recommendations for strengthening SKM systems and programs. These suggestions included: supporting FP/RH networks, developing a central FP/RH repository, tailoring resources to the local context, and preventing bottlenecks created by information gatekeepers.

Keywords: networks; reproductive health; network mapping; knowledge mapping; family planning; social knowledge management; Ethiopia

Introduction

Ethiopia has a population of approximately 77 million people, the second largest in Africa. Family planning (FP) was just introduced into its maternal and child health program in the 1980s and the FP program has made remarkable progress from a slow start. Use of modern contraception in Ethiopia has risen dramatically from 6% in 2000, to 14% in 2005, and up to 27% in 2011. At the same time, demand for FP has risen while unmet need for FP has decreased from 36% in 2005 to 25% in 2011. By improving its health infrastructure and introducing a health extension package that reaches remote areas through health extension workers, Ethiopia as been able to make huge strides in its FP program (USAID/Africa Bureau, USAID/PRH, Ethiopia FMOH, Malawi MOH, Rwanda MOH 2012, Central Statistical Agency and ICF International 2012).

Despite these significant improvements, however, Ethiopia's maternal, child, and reproductive health indicators are still quite poor. The TFR is has fallen (from 6.4 in 1990), but remains high at 4.8 children per woman. Furthermore, TFR in rural areas is 5.5 children per woman, compared with 2.6 in urban areas. The maternal mortality ratio is 676 deaths per 100,000 live births, and fewer than 10% of births take place within health facilities. Although the infant mortality rate declined by 39% between 2000 and 2011, the country still has a rate of 59 deaths per 1,000 live births; that is, 1 in 17 infants dies before his or her first birthday (Central Statistical Agency and ICF International 2012).

These indicators can be due in part to inadequate social knowledge management (SKM) systems, which can prevent or delay the exchange and flow of the latest information on family planning and reproductive health (FP/RH). SKM, a term coined by some to describe the use of social media as a means to achieve knowledge management (KM) objectives, and by others to indicate that KM can be an approach used for the 'social good', is used here to refer to a host of ways in which KM work is fundamentally social: relying on social exchange and learning, leveraging social networks, and building social capital (JHU·CCP 2013).

The SKM model, developed by the Johns Hopkins Center for Communication Programs (JHU·CCP), includes:

- An emphasis on community- and relationship-building, recognizing the fundamental role of **people** in KM.
- A focus on the **multifaceted** nature of the KM ecosystem, which calls for skills and integrated system building that weave together KM processes; information and communication technologies (ICT); organizational structures; and social networks.
- The creation of **strategic linkages** between KM products and services to connect users to related resources and improve reach, usefulness, and use.
- A **systematic approach** using **implementation science** principles of continuous and rigorous measurement and adaptive implementation.

- A focus on **reducing gender, income, geographic and generational disparities** in access to, control over, and benefits from SKM programs (JHU·CCP, 2013).

This SKM model was a guiding element for the development, implementation, and analysis of this study in Ethiopia.

Access to information

Access to current, evidence-based information is crucial for health professionals to design programs and provide high-quality services that improve overall health and well-being. In spite of recent advances in ICTs, however, many health professionals and policy makers in Africa still lack the crucial information needed to make evidence-based decisions (UNDP 2013; Pakenham-Walsh & Bukachi 2009).

The term 'information poverty' has been used to describe the phenomenon where certain individuals are heavily reliant on ICTs and fast-paced information sharing systems, while others lack access to these tools, materials, and services (Pakenham-Walsh & Bukachi 2009; Gebremichael MD & Jackson JW 2006). The severity of information poverty varies by location and affects individuals differently based on their context and geographical location. Specific information needs also vary by level of the health sector: In many settings, frontline health care providers often look for current information specific to their context, while those working at the district or national level will have different needs and differing access to ICTs (Kols 2009).

In Ethiopia, information poverty is extensive, and the digital divide is large as well. Telephone coverage is still scarce; although mobile coverage is expanding especially in urban areas, less than 10% of Ethiopians have a telephone subscription (fixed or mobile) (UNDP 2013). Also, while the country has greatly expanded its Internet coverage in recent years, Ethiopia has one of the lowest rates of Internet users in Africa – only 1.1% – compared with 15.6% in Africa (average) and 34.3% worldwide (Internet World Stats 2012). These indicators are consistent with other economic and health indicators in Ethiopia; despite great improvements over the last two decades, there are still great disparities.

A literature review revealed that little is known about specific information needs of health care professionals in Ethiopia. While there is anecdotal evidence of the dearth of information and the need for further information on FP/RH among providers, there is a lack of published literature of any kind (including grey literature) on which to make specific policy and programmatic decisions to improve systems for SKM and information exchange.

Social network analysis

Transdisciplinarity is the term used for a research strategy that crosses the boundaries of several disciplines to create an integrated and participatory approach. This type of

research is usually driven by a particular problem or issue, and its goal is the understanding of the *present world.* As such, its methods often involve the inclusion of stakeholders in the research itself. They become true research collaborators, helping to define the research questions, understand the results and lessons learned, and create solutions (Wickson et al 2006; Leavy 2011).

One innovative methodology for practicing transdisciplinarity is social network analysis (SNA) (Leavy 2011). SNA is a field that derived from network theory; it focuses on relationships among individuals or organizations, and uses visual tools to help understand the complex relationships among actors (Newman 2010; Newman et al 2006; Wasserman and Faust 1994). SNA methods such as Network-Mapping (Net-Map) involve stakeholders directly in the practice of identifying problems and developing recommendations for improvement (Schiffer 2007).

SNA has the potential to benefit healthcare settings, from the large scale (e.g., evaluating international networks) down to the micro-level (e.g., evaluating community networks). SNA can provide important tools to help understand the flow of information and the extent of knowledge exchange among organizations. However, the use of SNA in healthcare settings is limited (Chambers et al 2012). With regard to reproductive health, we do have evidence of SNA being used for policy analysis among international sexual health organizations (Drew 2011) and to improve maternal and child health indicators in certain settings (Gayen et al 2007; Souza et al 2009). However, there is little to no evidence of using SNA to evaluate health information networks or plan social knowledge management activities for the health sector, particularly related to FP/RH.

About this study

From 2009 to 2011, the Knowledge for Health (K4Health) project, funded by the United States Agency for International Development (USAID) and based at the Johns Hopkins Bloomberg School of Public Health Center for Communication Programs (JHU·CCP) conducted qualitative health information needs assessments in Ethiopia, India, Malawi, Peru, and Senegal. Results for India, Malawi, and Senegal are reported elsewhere (D'Adamo et al. 2012; Sylla et al. 2012; Kapadia-Kundu et al. 2012, Lemay and Bocock 2012). As part of this multi-country research effort, K4Health designed a needs assessment and Net-Map study in Ethiopia in order to: examine the SKM system among FP/RH organizations in Ethiopia at the national, regional, and district/*woreda* (community) levels; explain key determinants to access/use of the latest health FP/RH research and model practices; and identify ways to leverage networks and resources to transfer up-to-date research on FP/RH into practice.

As there is limited data on the needs of health care professionals at different levels of the health system, this study was intended to provide crucial information that could be used to improve the system of knowledge exchange in Ethiopia. This study was also designed

to understand the potential of SNA and transdisciplinary research to improve health networks and SKM systems.

Methods

The research team consisted of a team of independent researchers, as well as members of the K4Health Project. This study used qualitative research methods to explore the FP/RH information management system and its influencing factors in Ethiopia. Key informant interviews (KIIs), focus group discussions (FGDs), group interviews, and the participatory Net-Map tool were all used to gather data.

Research questions

This study sought to answer the following questions:

1. Who are the key stakeholders involved in FP/RH programs in Ethiopia, and how do they facilitate or inhibit the flow of information and other resources on FP/RH?
2. What are stakeholders' specific needs regarding FP/RH information?
3. What are stakeholders' preferred methods of communicating about FP/RH, and what are barriers and opportunities for information/resource exchange on FP/RH?

Sampling

Following the structure of the government, the research team undertook data collection at three levels: national, regional, and zonal/*woreda*. National-level data collection occurred in Addis Ababa. The Oromia, Amhara, and Afar regions were selected for the regional component. According to the 2007 national census, these three regions represent 62% of the Ethiopian population and are representative of the nation in terms of their household size. Based on convenience sampling, four zones and 10 *woredas* (within these three regions) were identified as sample areas. Researchers then employed theoretical sampling to select key organizations/informants. Key informants were program officers, information officers, senior advisors, and front-line service providers at their respective organizations.

Study instruments

Data collection instruments included: an interview preparation checklist, information about pre-interview preparation, an outline for the interview process, a sample introduction/overview of Net-Map, and specific questions for KIIs and FDGs. The instruments were piloted among three key organizations and amended according to their feedback.

Data collection

Data collection took place from August to November, 2010. There were two major phases to this process: The research team first sought to acquire knowledge on the subject

(literature review/official document review), and then conducted the needs assessment on the ground (empirical investigation).

The interviews were conducted using a semi-structured format, in which the interviewer presented a checklist or relevant guiding questions and then allowed respondents to add relevant information. FGDs were used in order to clarify conflicting opinions identified in the interviews, further explore the FP/RH knowledge management system, and identify specific in-country needs.

Participatory Net-Map exercises were also conducted among all participants. Net-Map is an interview-based SNA tool that helps people 'understand, visualize, discuss, and improve situations in which many actors influence outcomes' (Schiffer 2007). In the Net-Map exercises conducted in this study, participants identified FP/RH organizations, drew links among them, discussed actors' roles in facilitating/inhibiting information flow, and added 'influence towers.' (In this setting, participants used coins to create influence towers; in other settings, stackable wooden discs or other similar-sized objects may be used.) An organization was considered 'influential' if it was mentioned by five or more study participants.

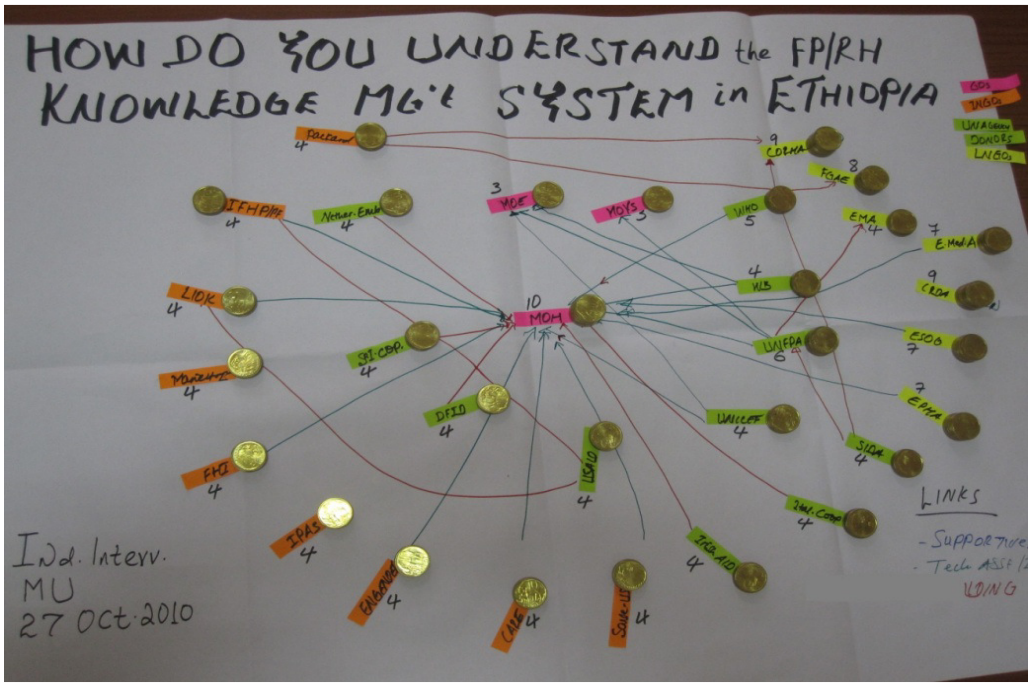

Photo 1: The result of an interview-based individual Net-Map exercise. *A typical Net-Map exercise will result in a visual representation of key actors, their linkages, and levels of influence, helping to make strategic decisions in complex situations. The coin towers represent relative influence.* (Photo credit: Ethiopia study team)

Since there were no pre-existing categories of actors and links in Ethiopia, the research team developed criteria based on the literature review and pre-test findings. The link categories used were formal authority/supportive supervision (later removed from the analysis), technical support, and funding. The actor categories used were governmental organizations (GOs), international NGOs, local NGOs/associations, and donors/bilaterals.

Participants also discussed health information needs and challenges. Specifically, they were asked to provide information about the strengths and weaknesses of the FP/RH information management system in Ethiopia. They also helped analyze lessons learned and determine potential solutions.

The research team started data collection and analysis at the national level (Addis Ababa) and then travelled to the three regions and their respective zones for further data collection and refinement of the analysis. The iterative process of side-by-side data collection and analysis continued until a point of theoretical saturation—that is, until no new information was emerging.

Data analysis

Data analysis involved Visualizer software (for Net-Map data), manual coding, and grouping by theme. The research team analyzed all data from KIIs and FGDs manually. A content analysis was conducted using coding, sorting, and organizing by theme. Then, the lead researcher looked at all the groupings to understand the context and analyze the responses.

For Net-Map data, the research team used Visualizer software in order to generate a computerized chart (Net-Map) of the data obtained in the Net-Map exercises. One Net-Map was created for each level (national, regional, zonal/*woreda*) and then an aggregate map was created, combining data from all levels (Figure 1). By examining visual representations of the relationships described in the Net-Map exercises, the research team analyzed the characteristics of the various actors, their relative influence, technical support, and funding. From this analysis, they were able to describe the influence networks and current system of information flow in Ethiopia.

Originally, the researchers had also planned to include an analysis of formal authority/supportive supervision, but this was removed from analysis when it was realized that participants misunderstood this concept. In Ethiopia, there has been a recent shift from 'formal command' in government structures to a more participatory supportive supervision. While this has not been fully implemented or communicated clearly among responsible bodies, this concept did affect the way many respondents described the authority link during their Net-Map sessions. During this transition period, there seemed to be a vacuum in the authority line of Ethiopia's FP/RH program. Consequently, of the 156 links displayed in the overall aggregate map, the research team observed only 6 authority links, all of which were among different government actors. Thus, the authority

link analysis did not express what it was intended to measure in this study, and the research team decided to eliminate it from the Net-Map analysis in order to avoid unnecessary confusion or bias.

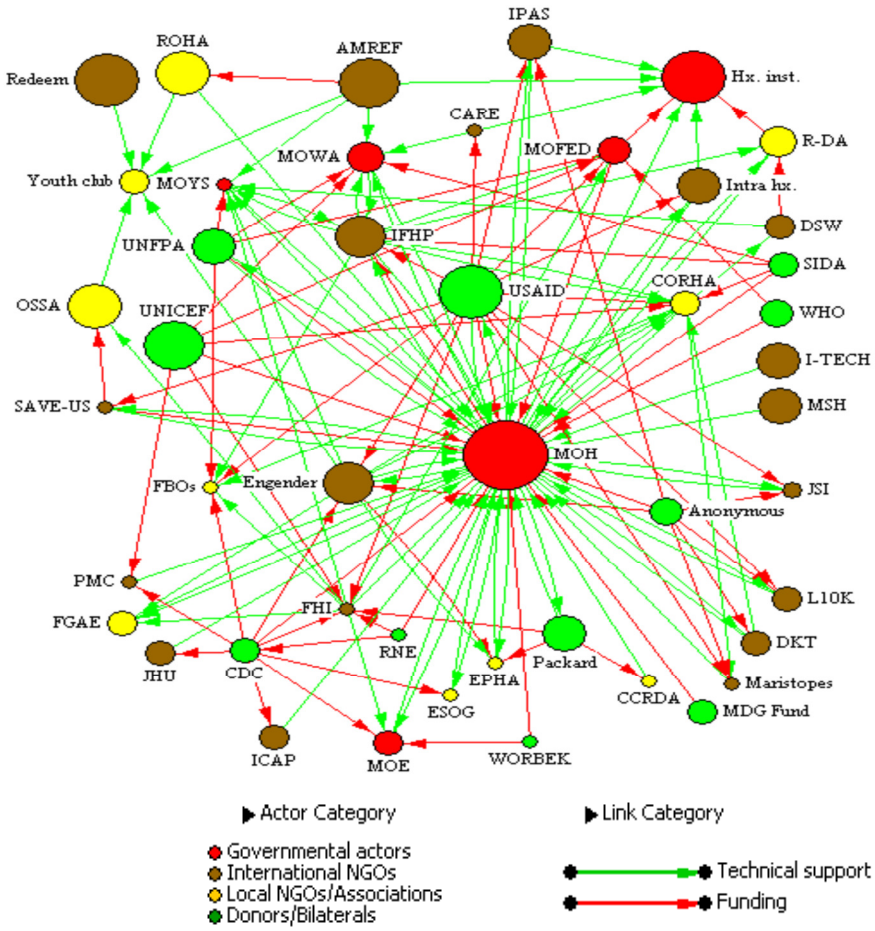

Figure 1. Aggregate Net-Map (national, regional, and zonal/*woreda* levels)

Overall results

Table 1 summarizes the number of interviews and FGDs by location. The research team conducted 21 interviews (17 individual interviews and 4 group interviews) and 2 FGDs, involving a total of 42 study participants. As mentioned earlier, Net-Map exercises were also conducted among all participants.

Table 1: Number and location of key informant interviews and focus groups

	National	Regional/Zonal					Total
TYPE	**Addis Ababa**	**Amhara**		**Oromia**		**Afar**	
	National	**Regional**	**Zonal/ *Woreda***	**Regional**	**Zonal/ *Woreda***	**Regional/*Woreda***	
Individual interview	11	3	--	1	--	2	**17**
Group interview	--	--	1	1	1	1	**4**
Focus group	--	1	--	--	--	1	**2**
TOTAL	11	4	1	2	1	4	**23**

Results of Network-Mapping (Net-Map)

Actor analysis

Overall, 103 total actors were identified through Net-Map, of which 46 were named the 'most influential' (i.e., they were recognized by two or more actors with average influence rank of five or more). Of the 46 'most influential' actors, 20 were international NGOs, 10 local NGOs, 10 donors/bilateral organizations, and 6 governmental organizations. Overall, there were more donors and bilateral organizations than NGOs at the national level.

When looking at these numbers, the proportion of international NGOs is almost double that of local NGOs/donor agents and triple that of government actors. Therefore, it appears that the overall FP/RH system is highly dependent on international NGOs. This does not indicate that RH-related services are primarily *delivered* by NGOs—or that NGOs are the most *influential* actors—just that the sheer number of NGO actors is much higher than that of governmental actors.

Differences among the various regions and zones/*woredas* were also identified. Namely, FP/RH actors are not evenly distributed based on the FP/RH needs of certain regions. As one participant explained, 'though there are different international and local NGOs, only a few are working on FP/RH programs in Afar.'

Many donors build capacity among regional actors through their respective international NGO partners and work together to determine distribution and the focus of their activities, NGOs often tend to settle in relatively comfortable areas. For instance, because of its harsh climate, poor infrastructure, volatility of peace, and remoteness, fewer NGOs

work in the Afar region than other areas of the country. RH problems are often worse in such areas, but the number of NGOs is negligible there. Thus, despite the Ethiopian government's 'territorialism, harmonization, and alignment' strategy—in which different actors are encouraged to divide based on geographic and thematic focuses—there is not yet an even distribution of FP/RH actors based on need.

This unfair distribution of actors was named as a problem among participants, who expressed the need for a model of networking workable for existing actors and programs.

> *In order to avail all RH-related services to every community, it* [the "territorialism policy"] *needs to be complemented with fair distribution of actors and functional networking among them. This is said to synergize strengths, nullify limitations, and avoid unnecessary duplications, resource wastage, and conflict.* (Respondent from a U.S.-based NGO)

A lack of stability among actors was also expressed, particularly among those working in the Afar Region. As one zonal-level participant stated,

> *…international NGOs usually phase out in less than five years. When they leave, the program usually collapses.* (Respondent from a local NGO–ROHA WEDDU—based in the Afar Region)

Another zonal-level participant expressed a similar sentiment, and explained why government programs are seen as more stable.

> *Most NGOs and donor/bilateral engagements, however strong they may seem at this moment, will be phasing out at some point in time. But the government-based programs will remain so far as the constitutional order is there. Therefore, empowering the government line offices at different levels ensures sustainability.* (Director of ROHA WEDDU)

Information flow

Participants placed the Ministry of Health (MOH) and its line offices at the center of the Net-Map (see Figure 1). The MOH appears to play a critical role in information dissemination and flow at all levels of the health system. The Integrated Family Health Program (IFHP) and the Consortium of Reproductive Health Associations (CORHA) are also highly connected and central to the information system.

At all levels (and especially at the zonal/*woreda* level), it appears that the Ministry of Health may receive more information than it dispatches. This can create a situation where information is slow to diffuse. Overall, participants were aware of widely-consulted and well-researched national policies, strategies, and guideline documents on RH, but stated

that these materials do not seem to be widely communicated to national actors. According to one national-level participant,

> *…government policies/strategies are not well communicated, even to the NGOs operating on the topic. Furthermore, attendees of different training workshops are not passing the lessons they draw to others in the organization.*

Influence

When looking at aggregate data (see Figure 1), the MOH was given the highest influence ranking, followed by donors/bilateral organizations, NGOs with direct grassroots links, and international NGOs. At the national level, the MOH was given the maximum influence ranking, followed by the U.S. Agency for International Development (USAID) and Family Guidance Association of Ethiopia (FGAE).

Participants agreed that the MOH oversees the health sector, including FP/RH programs. However, they did highlight that top-down (vertical) formal authority is no longer practiced in the country.

> *The former "vertical military command" or "boss-is-always-right" approach has become history. Conversely, joint planning, implementation, and evaluation with supportive supervision is a highly uplifted approach. (National RH Coordinating Body member)*

Donors and international NGOs were named the most influential actors at the regional level, where government actors and local NGOs were said to be smaller in number and less influential. At the zonal/*woreda* level, however, government and local NGOs were reported to be active and influential. Zonal level data show a proportionally higher *number* of local NGOs (as well as higher centrality) compared with other levels. Faith-based organizations were also said to be somewhat influential at the grassroots level.

Funding

In the aggregate Net-Map (Fig. 1), USAID was named as the major source of FP/RH funding and the MOH was reported as the major funding recipient. At the national level, government actors appear to be central to the funding system. Participants also reported poor networking and resource management systems at the federal level. USAID is the main source of funding at the regional level, although many actors (regional development associations, for example) can have diverse sources of funding. Participants explained that at the zonal/woreda level, donors often channel funds to actors through international NGOs that work on community-level projects.

Table 2. Overall results from all three levels

	Overall findings	**National level**	**Regional level**	**Zonal/*woreda* level**
Actor analysis	**103 total actors (46 most influential)** 46 'most influential' actors: • 20 international NGOs • 10 local NGOs • 10 donors/ bilaterals • 6 governmental organizations	More donors/ bilateral organizations than NGOs	International NGOs highly engaged Distribution of FP/RH actors varies among regions - not based on geography or need	Proportionally higher level of local NGOs compared with other levels
Information flow	MOH at the center of information flow	MOH, IFHP*, and CORHA** play a critical role in information dissemination	Most technical support links relate to the Regional MOH	MOH appears to receive more information than it dispatches
Influence	MOH given highest influence ranking, followed by: donors/ bilateral organizations, NGOs with direct grassroots links; and international NGOs	MOH given the maximum influence ranking, followed by the USAID and Family Guidance Association of Ethiopia (FGAE)	Donors and international NGOs most influential Governmental actors and local NGOs are smaller in number, less influential	Government and local NGOs are active and influential at the grassroots level Faith-based organizations also named as influential
Funding	USAID: main source of FP/RH funding MOH: main recipient of FP/RH funding	Government actors central to funding system Poor networking and resource management systems	USAID main source of funding Regional development associations have large number of different funding sources	Donors often channel funds to the zonal/*woreda* actors though international NGOs

* Integrated Family Health Program
** The Consortium of Reproductive Health Associations

Results of information needs assessment

Main information needs
Common FP/RH information needs among participants at all levels of the health system include:

- Timely, regular access to the latest FP/RH information;
- Central repository for latest FP/RH information;
- Diverse types of materials;
- Improved ICT; and
- More coordination and stronger professional networks.

At the national level, participants mentioned the need for up-to-date information in order to make high-level decisions about FP/RH. They also stated that they lacked knowledge about other national FP/RH actors. Regional stakeholders' needs are multidirectional: They need information on policy and strategy from the national level and updates on FP/RH programs from communities. They are also looking for consistent and up-to-date information on FP/RH. At the community level, stakeholders need easy-to-understand information in local languages and adapted for local contexts. They also mentioned the need for diverse types of materials.

Many responses focused on the lack of coordination, networking, and proper communication among FP/RH organizations. Overall, actors were perceived as lacking a network or system for information sharing. One national-level respondent stated:

> *Many actors are focusing in their own area of engagement, rather than seeing the comprehensive package and the national situation—the big picture.*

Participants stressed the need to put information in context and to simplify complex information, particularly for those working at the community level. One *woreda*-level participant outlined their own needs by saying:

> *We seek simple, well-focused, understandable information, in small quantities, in a local context/language, and on a regular basis.*

At the zonal/*woreda* level, there is also a lack of standard training and a limited distribution of guideline materials.

> *[In] four years, we never got training from the MOH at the zonal/*woreda *level. We relied mainly on our undergraduate study materials. [There is] no budget for training from the government health bureau at our zone and* woredas. *No easy access of information to updates and best practices. We always plan trainings on FP/RH, but never accepted due to budget deficit. Leave alone FP/RH, there is no*

> *training and supply on delivery service. To fill the gap, we made direct contact with interested NGOs working in our zone. Those international NGOs provide us with trainings, guidelines, posters, and supportive supervision.* (Zonal RH Officer in the Amhara region)

Preferred communication channels

The Internet is the preferred channel at the national level. Due to connectivity issues, the Internet is mainly used only for email at the regional level, and is rarely used at all at the zonal/*woreda* level. Mobile phones are widely used throughout Ethiopia. At the national and regional levels, the short message system (SMS) feature is preferred, but that feature is not used much at the zonal/*woreda* level due to lack of training. Face-to-face meetings were named as an important communication channel at all levels, as were print materials. However, national-level participants mentioned the need for journal articles and other print publications while regional and zonal/*woreda* respondents mentioned the need for a wider variety of print materials, from training manuals to best practices. Finally, CD-ROMs are frequently used at the national and regional level, and radio was mentioned as an important source of information at the zonal/*woreda* level.

Barriers to accessing and applying FP/RH information

At all three levels, participants mentioned that lack of coordination and professional networking prevents them from accessing information on FP/RH. Many study participants expressed that they would like to receive a profile of prominent actors and their networks on a regular basis so that they could forge strategic partnerships. Overall, participants felt that there was a lack of coordination at all levels:

> *The FP/RH response is not well coordinated, thus duplication of effort and resource wastage is widely observed. In addition, FP/RH related information is not well communicated and good practices are not shared among the different actors.*

National-level respondents also discussed the lack of a central repository for the latest FP/RH information. At the regional level, slow, unreliable Internet connections were listed as a barrier, along with the lack of a controlled system for disseminating information. A regional-level participant stated:

> *…[we have] diverse and uncontrolled sources of information on FP/RH, which creates confusion in some areas.*

The main barriers listed at the zonal/*woreda* level were lack of ICT training and the overall lack of access to information on FP/RH, particularly up-to-date, evidence-based information. One zonal/*woreda*-level respondent pointed out the lack 'easy access of information to updates and best practices.'

Table 3. Results of FP/RH information needs assessment, by level

	National level	Regional level	Zonal level
Main information needs	• Up-to-date FP/RH information for making high-level decisions • Knowledge about other national FP/RH actors	• Policy and strategy from national level • Updates on FP/RH programs from communities • Consistent and up-to-date information on FP/RH	• Easy-to-understand information in local language and adapted for local context • Diverse formats
Preferred communication channels	• Internet • CD-ROMs • Publications • Face-to-face meetings • Mobile phones (especially SMS feature)	• Internet (used mainly for email) • CD-ROMs • Print materials • Mobile phones (especially SMS feature) • Face-to-face meetings	• Print materials • Face-to-face meetings • Radio • Mobile phones (not SMS)
Main barriers to accessing information	• Poor FP/RH information management system • Lack of a central repository for latest FP/RH information • Lack of coordination and networking	• Slow, unreliable Internet connections • No controlled system of disseminating information • Lack of coordination and networking	• Lack of ICT* training • Lack of coordination and networking • Dearth of information on FP/RH

***ICTs =** Information and communication technologies

Discussion

This study sought to explore Ethiopia's current FP/RH SKM structure; examine information flows and barriers at different levels of the health system; and identify areas to strengthen health information sharing and use. Using Net-Map—a novel, participatory, transdisciplinary approach—yielded a highly visual presentation of the data that identifies key FP/RH actors in Ethiopia, explores the nature of relationships among the actors, and examines the level of influence of the different actors with regard to information exchange. The researchers, working hand-in-hand with the participants, were able to identify bottlenecks to information flow and opportunities to improve that flow across health system levels in Ethiopia. Most participants identified by the research team were already aware of the shortcomings of Ethiopia's KM system, and were fully willing to share their thoughts with the study team. The study included a wide range of professionals, and was able to obtain information at the national, regional, and

zonal/*woreda* levels; utilizing a local research consultant—an individual not tied to a particular institution—likely reduced response bias.

In spite of the advantages of using Net-Map in this context, there were some key limitations. For one, although respondents often knew about the focuses/goals of other FP/RH actors, they often had limited knowledge about actors with whom they do not directly network, and were thus unable to articulate links and levels of influence of those organizations. Also, there were no objective criteria for identifying prominent actors and determining influence ranking, so this part of the study was more subjective. Some organizations were seen as favoring themselves and their own social network. For example, one international NGO gave itself the maximum ranking, but was not even considered as a FP/RH actor by many respondents. This usually happened due to lack of information about others' activities, as well as lack of consensus about prominence and influence. Such actors may consider their respective organizations to be among the most influential, while others gave them a relatively lower ranking. Participants also sometimes misunderstood the differences between programs and organizations; in some cases—for example, IFHP—the program was named as an actor, rather than the implementing organization(s). Finally, there was some confusion over the authority link. Some NGOs assumed that the MOH had formal authority over them and their line offices (i.e., that the MOH could guide, supervise, and even revoke license). Others felt that the MOH's authority was just supportive supervision. Consequently, the authority link could not measure what was intended, so the research team decided to eliminate it from the final Net-Map and analysis.

Furthermore, it is important to emphasize that the results of the Net-Map study reflect what study participants perceived, based on their own experiences, whether or not they reflect the true nature of relationships, funding streams, or other topics. In some cases, the information reported by participants was not actually factually *true*, and this could be a significant limitation. For example, a large donor organization was incorrectly named as one of the main funders of FP/RH activities, because they fund and provide technical assistance for the prevention of mother-to-child transmission (PMTCT). While PMTCT is an important *element* of RH, FP/RH activities have a separate funding stream and are not financed directly through this donor organization. These results have been included in their true, uncorrected form, however, in order to show the views and opinions of the study participants.

A major finding of this study is the heavy reliance on the MOH for information about FP/RH. The MOH seems bombarded with information (from almost *all* other actors). While this can be an advantage on one hand—as it is a central organization with access to ample information to plan evidence-based programs, act as central knowledge repository, and control knowledge dissemination—it does not seem to be functioning at its full capacity with regard to knowledge sharing.

Many participants agreed that although different organizations generate technical information, it is the MOH that actually controls its output and releases this information on their behalf—in the form of policy/strategy documents, guidelines, trainings, or handouts. However, participants also noted that the country lacks a central repository for information, so it appears that this situation is creating an information bottleneck. Access to too much information can create confusion, conflicting messages, and lack of standards. Furthermore, the MOH is seen as the gatekeeper—not only for technical information, but funding as well. This powerful role does not appear to be accompanied by a strong SKM system; thus, the MOH are not only overburdened with information, but are likely preventing information from reaching other actors.

With regard to funding, it is important to note the role played by international NGOs. While most national-level funding comes from USAID and other bilateral/multilateral organizations, much of the regional and sub-regional funding received by local NGOs is actually channeled *through* international NGOs. Furthermore, participants—particularly those at the zonal/*woreda* level—also stressed the lack of security they felt with regard to international NGOs, feeling that they would most likely 'be phasing out at some point in time' (according to the director of a local NGO). This can, no doubt, lead to some uncertainty about working with international NGOs, and yet they control much of the community-level funding. Therefore, it appears more needs to be done regarding communication among local NGOs and international NGOs that provide funding/support at the sub-regional levels.

There are significant differences among the various levels—with regard to information needs as well as actor influence, funding, and information sharing. As is common in other settings, national-level professionals in urban areas receive more information than those working at the regional/sub-regional levels, particularly in more rural areas. This is particularly true in Ethiopia, a largely rural country where only about 1% of the *entire* population has access to the Internet, and where only 10% of the population has a telephone subscription (either mobile or fixed) (UNDP 2013). This information poverty presents a significant challenge for those working on SKM activities in Ethiopia. While it is crucial to reach those at the national level with fast-paced, online information, those at the community levels need up-to-date information as well. This will require different strategies, depending on the information needs, preferences, and technological barriers of different groups of health professionals.

Finally, while faith-based organizations (FBOs) were listed as influential at the zonal/*woreda* level, they were not mentioned specifically in any other category; this points to an opportunity, particularly in a country like Ethiopia where a large portion of the population participates in religious organizations. One study participant maintained that FBOs do not make a valuable contribution due to the lack of knowledge on the FP/RH. However, most participants agreed that FBOs had potential, particularly in

addressing socio-cultural determinants of health and affecting positive behavioral change with regard to FP/RH issues at the community level.

Overall, the aggregate findings highlight a vibrant FP/RH program with ample actors, links, and resources. Nevertheless, the country still faces some major challenges, namely lack of extensive networking and a poor information management system.

Conclusion

In summary, working with the study participants, we identified a large number of actors working on FP/RH in Ethiopia, but the resource allocation does not match the current needs. That is, health workers and health information may be abundant for one location or topic area but virtually non-existent in others. In general, the MOH lies at the center of the information system, and information can be slow to reach those who need it. The MOH is the most the most influential FP/RH actor at the national level, and NGOs become increasingly influential at the regional and zonal/*woreda* levels. In terms of health information, health workers need up-to-date, understandable, and contextualized FP/RH information, more coordination among organizations, a stronger central system of disseminating information on FP/RH, and improved training and access to ICTs.

Based on findings from this study, the following recommendations were identified to improve the SKM system among FP/RH organizations in Ethiopia:

1) Communicate governmental policies regularly among stakeholders at all levels of the health system, to ensure high-quality FP/RH programs & services.
2) Set up programs for learning and sharing FP/RH information, including resource centers, at all levels of the health system.
3) Strengthen systems that facilitate exchange of up-to-date information, including ICT infrastructure, SKM system, and FP/RH networks.
4) Develop well contextualized materials specifically geared to the understanding level of the policy makers, program managers, and health professionals at different levels (including health extension workers, who are vital to FP/RH service provision).
5) Build the capacity of grassroots actors to ensure community ownership and sustainability.
6) Leverage the support of influential actors, particularly at the community level.

This study highlights significant gaps in access to up-to-date FP/RH information throughout Ethiopia's health system. To close these gaps, a national SKM strategy and an information dissemination system are needed. Together, these components should leverage influential actors and include resources tailored to the local context. A more advanced SKM system—one that includes stronger FP/RH networks—could improve

dissemination and uptake of evidence and best practices, enhance service delivery, and improve health outcomes overall.

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