

Planned social network change and modern contraceptive use in a rural Ethiopian community

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Background Over the last decade, Ethiopia has substantially increased uptake of modern contraception and experienced a decline in total fertility, coinciding with implementation of the national Health Extension Programme (HEP), involving an extensive deployment of health extension workers (HEWs), and a health development army (HDA) of volunteer families. The dynamics of such change are important. This multi-method qualitative study was conducted in a rural community in Oromia, Ethiopia, as part of a larger effort to understand the influence of social networks on modern contraceptive use.

Methods Data were collected in five focus groups and twelve individual interviews (n=59) with men, women, adolescents and key informants in a rural area in Oromia, Ethiopia, together with participant observation. Analysis was conducted using NVivo qualitative research software.

Results We found two types of decision-making social networks for family planning: (i) one pertaining to basic decisions about having children per se, which remains the prerogative of traditional, patriarchal social structures; and (ii) a second network, which included HEWs, that applies after initial childbirth, concerning family size and spacing decisions for additional children.

Conclusions While this study supports other research on the effectiveness of the HEP, the study also identified limitations, and raised questions about the replicability of the Ethiopian model for reducing fertility. The level of government commitment and resources required for the HEP are linked to Ethiopia's key position among recipients of development assistance, likely connected to its history and geopolitical role. These circumstances may not be widely applicable.

Declining fertility has long been regarded as a key to economic growth in developing countries. Fertility decline is associated with a broader social transformation that has led to reductions in preventable maternal mortality (1, 2), and a range of positive outcomes at the individual, family, and population levels, including increased economic growth, reduced poverty, higher levels of

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education, and faster progress toward gender equality (3–5). For these reasons, contraceptive use is often considered a marker of development, and in a broader sense, of modernity, (eg, 6, 7) – though care must be taken to avoid facile, unsubstantiated and universalized prescriptions concerning the elements of what does or does not constitute a movement towards modernity. Because childbearing is fundamentally connected to social organization, gender roles, survival, family and village sustainability, and commonly held beliefs about life trajectories, significant changes in fertility necessarily impact, and are impacted by, these important social domains.

Heady, for example, draws on anthropological theories of exchange (eg, 8 and others), and others and concludes that “parents have children, at least in part, for the sake of other people” (9); that is, children are part of the exchange or “bargain” involved in marriage. This is particularly salient in an African context where families have historically been non-nuclear, and embedded in lineage/clan relationships with their attendant obligations and decision-making processes (10, 11). In high fertility settings, it is not uncommon to attribute the number of children to the will of God (12), a causal locus that is likely applied to multiple circumstances. Movement from this kind of external causality to individual agency regarding family decisions may be a key marker of fertility transition (13, 14). Other issues include attitudes about appropriate family size as well as concerns about possible contraceptive side effects (15). More generally, the spread of information and beliefs about fertility reduction and family planning may be part of a larger set of ideational changes that also include attitudes toward gender roles, the value of education, perceptions about future economic opportunities (and the reality of such opportunities), the locus of individual identity (e.g, village, clan, or broader constructs of nation), and other issues.

At a micro level, fertility-related ideational changes diffuse through social networks and social units such as villages. However, there are few empirical studies exploring current thinking about social networks and decisional processes in the context of fertility transition. One of the few documented pathways involves a north-south diffusion through elites who interact regularly with developed country settings (16). Such a model links fertility to a complex thicket of class identification and aspiration, as played out in the relationships between developed and less developed countries, and potentially even manifested in rural areas through the diffusion of aspirational models and connections, even if those are not directly present.

As part of a more extensive study on social networks and associated norms related to family planning decision-making, this paper summarizes qualitative data on decision-making networks, attitudes and norms, patterns of change, and relevant social context in the predominantly Muslim, rural region of Oromia, Ethiopia. Data collection occurred between July and September of 2016, with the goal of exploring village social structures and the articulation of those structures with values and norms that may impact the use of modern contraception. Results of this qualitative research were used in developing social network survey questions and to develop protocols for continuation of the larger study. In addition to these specific research questions, we understood that there is a confluence of broader factors in Ethiopia that shape fertility changes in the lives of individuals who are situated in the crossroads of globalization, national development efforts, a long history of centralized government, and larger geostrategic considerations. Our assessment sought to contextualize the data with these factors in mind.

Fertility transition in Ethiopia

It is worthwhile first to place Ethiopia in a regional context. Sub-Saharan Africa has generally lagged behind the rest of the world in fertility reduction (17), in large part due to low uptake of modern contraception. The modern contraceptive prevalence rate is lower, and unmet need for family planning is higher, in sub-Saharan Africa than in any other region of the developing world (18, 19), presenting a challenge to meeting health and development goals.

In Ethiopia, however, a fertility transition is actively underway, associated with a substantial national program to build a community-based health promotion infrastructure. Total fertility dropped from 5.4 children in 2005 to 4.6 in 2016 (20), though with a wide gap remaining between urban and rural areas. Between 2005 and 2016, modern contraceptive use in Ethiopia increased from 14 percent in 2005 to 35 percent in 2016 (20). Various factors have been proposed to explain this increase in contraceptive use, including growing political will, major external funding, and the implementation of Ethiopia's large, government-sponsored Health Extension Programme (HEP), beginning in 2004–2005 (21).

Funded largely through the U.S. Agency for International Development (USAID), the HEP very likely played a significant role in increasing contraceptive demand (22–24) in a remarkably short period of time. Across Ethiopia, a cadre of some 39,000 health extension workers (HEWs) work in over 15,000 village “kebeles” (neighborhoods), serving as intermediaries between the community and the government-provided primary health services, particularly for children and mothers (21, 24, 25). Each HEW supervises 15 to 20 team leaders of the health development army (HDA), which is comprised of volunteer women who work closely with subgroups of families to encourage community participation, help the HEWs convey health information, and whose families serve as behavioral models. The community-based HDA structure is designed to promote self-efficacy and healthy lifestyles through maternal and other basic health services, and access to family planning (22, 26–28). According to UNFPA (1), 82 percent of Ethiopian women obtain contraception from the public sector, and the government attributes the increase in contraceptive use in rural areas to the work of the HEWs (29).

The broader context of this intensive, centrally-initiated effort is important and possibly unique. Ethiopia and its national development programs have been shaped extensively by its place in the global panoply of development aid. According to the Organization for Economic Cooperation and Development (OECD), the government of Ethiopia ranks in the top five recipients of overseas development assistance (30), and development assistance represents more than half of the entire Ethiopian national budget (31). From 2006–2015, Ethiopia was the second largest recipient of U.S. family planning/reproductive health funds (32). Ethiopia was also one of the initial focus countries for the President's Emergency Plan for AIDS Relief (PEPFAR), the U.S. government initiative to combat HIV/AIDS, beginning in 2003. Significantly, military assistance to Ethiopia increased dramatically in the years following the September 11, 2001, terrorist attacks, and coinciding with Ethiopian support for anti-terrorist actions in neighboring Somalia (eg, 33). There is also an argument to be made that the long history of centralized rule in Ethiopia, unique in sub-Saharan Africa, has provided a ready foundation for such top-down efforts – though the Oromia region was only incorporated into Ethiopia in the late nineteenth century as part of the expansion southward under Emperor Menelik II (34, 35). At the same time, it is important to acknowledge that a key goal of the HEP is to promote decentralization of primary health care and other health promotion activities, to promote universal coverage, and to enable families to take responsibility for maintaining their health (26).

Setting

The research summarized herein was conducted in the large, ethnically diverse regional state of Oromia, where over 90 percent of residents live in rural areas and agriculture is the main source of income (36). Oromia is divided primarily between Muslims and Orthodox Christians, with higher percentages of Muslims residing in rural areas and Christians in urban areas. There is also a significant Protestant minority. Only a very small percentage of the population practices traditional Oromo religion. According to 2011 Demographic and Health Survey data for Oromia, the region's population is 46.4 percent Muslim, 28.1 percent Orthodox Christian, 23.2 percent Protestant, and just 1.7 percent traditional religion (37–39). Village structure is typically patriarchal and may be influenced by both religious hierarchy and the persistence of the traditional *Gadaa* age-graded leadership system (40). In general, fertility is highest among rural Muslim women, followed by rural Orthodox women, with low

education, and is affected by early marriage traditions (41). In 2014, the total fertility rate in Oromia was 4.4, higher than the national average of 4.1 (42). Use of modern contraception in Oromia is lower than in most regions, at 28.1 percent, compared to 35.3 percent in Ethiopia as a whole and 50.1 percent in the capital, Addis Ababa (20).

METHODS

From July through September of 2016, the research team conducted five focus groups and twelve individual interviews (n=59) with men, women, adolescents and key informants in a rural area in Oromia, Ethiopia, together with participant observation. Participants ranged in age from 14 to 55, the median and mean ages being 18 and 23, respectively. Most participants (68.5 percent) were female. All identified themselves as Muslims and as members of the Oromo ethnic group.

Key informants included local health clinic staff, HEWs, midwives, teachers, and religious leaders, recruited by Jimma University research team members through existing contact networks. These individuals were selected based on the likelihood that they would have knowledge of broad community patterns. As a second stage, we conducted five focus group discussions with men, women, adolescent boys, and adolescent girls, and a set of life history interviews with mothers and adult women of childbearing age who had no children. Free-listing and ranking were employed during the interviews and focus groups to identify the field of decision-makers and their relative importance. Hypothetical scenarios (vignettes) about women who were contemplating children were included to elicit commentary and to minimize social desirability bias. All interviews and focus groups were conducted in Afan Oromo (with Amharic versions available if needed) by native speakers who were trained in interview techniques through a week-long workshop conducted collaboratively with researchers from Jimma University in Ethiopia and George Washington University in the United States. During the training, Jimma University research team members also provided important feedback on the protocols, resulting in some modifications. Focus group discussions were conducted in the village primary school and interviews were conducted outside of homes, at the health posts or in the high school and health office in the nearest town.

Focus group and life history interview respondents were selected through a random sampling procedure. Research team members first conducted a household enumeration activity in three contiguous *gotes* (clusters of about 30 households) in a *gare* (an area of approximately 90 households). Based on the number of individuals needed for focus group discussions or life history interviews, we used a proportional skip pattern after a randomly selected seed to identify households to choose participants for each category (eg, mothers, adolescent girls). This procedure was in part intended to avoid over-representation of respondents who had previous experience with research, which may have occurred with open voluntary recruiting.

In addition, to obtain data on the immediate local context during the study period, the first author collected observational data using descriptive notes and photographs.

Analysis

The interviews and focus group discussions were audio-recorded, transcribed, and translated to English by Jimma University research staff. These data were analyzed at George Washington University, using thematic analysis conducted with NVivo v.11 qualitative research software (43). Coding was both deductive and inductive. A basic *a priori* codebook was developed from key research questions related to attitudes, practices, decision-making, decisional influences, and social networks as implemented in the interview and focus group guides. Two researchers then independently reviewed transcripts to expand the initial codebook, then modified the codebook as themes emerged, and convened to discuss and reconcile coding discrepancies. The codebook was subsequently shared with research partners at Jimma University and their edits were incorporated into a revised final codebook. One researcher coded all transcripts and another coded 20 percent to ensure consistency across coding. Both

researchers met over the course of the analysis to discuss codes and reconcile discrepancies. The research team sought to identify concordance and discordance between responses from the different data collection modalities (and different categories of respondents) and to triangulate the data among all three data collection modalities – focus groups, life history interviews, and key informant interviews. Observation data provided additional, useful context.

RESULTS

Data show that the penetration and effectiveness of the HEW and HDA mechanisms in this rural Oromia community are extensive, that ideational change has occurred, and that the HEWs have become part of the decision-making process regarding fertility, as well as key providers of health information concerning children and women. However, the data also suggest the limits of this approach, at least as of the date of the research. The following is a summary of analyzed data, organized by major themes.

Bifurcation of attitudes and norms related to fertility

Attitudes regarding fertility fell in two categories: 1) attitudes about having children *per se*; and 2) attitudes about the number of children to have and the spacing between them.

Having children at all

This first category encompasses a domain still powerfully influenced by longstanding, culturally embedded gender roles, perceived life trajectories, and family expectations. Implicit in marriage is a requirement to have children, bearing out the exchange nature of the relationship discussed in work referenced above by Heady (9) and others. Importantly, adherence to this norm was expressed across age and gender categories. An adolescent boys' focus group participant said "There is no woman says I don't want to have child." According to a Health Education Coordinator and key informant, "[G]enerally, it is impossible for women to live good life without having child, but males can live a good life in any situation. Rather, if women lacks child her life will be darken." A religious leader (key informant) stated flatly that "Becoming only husband and wife with no child is meaningless."

Religion and the childbearing imperative. For a subset of respondents, the childbearing imperative was also framed in reference to the will of God. An adolescent girls' focus group respondent explained it as follows: "[A] child is considered as gift of Allah, therefore if one woman rejects to have a child, it has many connotations besides lack of respect and acceptance. Everybody needs to have a child in a stable marital relationship." In a men's focus group, one respondent stated that a woman "should accept God's decision and this is the work of God. She should pray as God is the sole giver of child." Similarly, a women's focus group respondent said, "As my sister told you, when our God doing for us we shouldn't be against him. So the decision is by the will of God and she can't decide."

Getting married is traditional, basic, and not an option. Study data underscores the understanding that the bifurcation of attitudes and practices around childbearing is part of a cluster of related norms, including those related to marriage. Just like giving birth, marriage is viewed as a natural and *necessary* part of a meaningful life. Said one mother (life history interview), "Eh, getting married is inevitable. There is an Oromo proverb which states "marriage and death are inevitable."

Marriage presupposes children. Marriage and children are intricately and temporally connected. It is important to note that spacing was commonly viewed as an acceptable practice for married women *after* conceiving their first child. It is the norm for women to give birth within two years of marriage in order to "prove" that they are able to conceive, again supporting the exchange element described earlier. This was framed as a universal, and mandatory: "Everybody needs to have child including me. A woman without children is also not loved by her husband at all, just because of lack of child. Women need to have child

when she gets married, because it is the only way to lead happy life in a marriage” (key informant interview, Health Education Coordinator). This sentiment was cross-generational. An adolescent girls’ focus group respondent, responding to a scenario about a young married woman, said “having a child is not something optional rather she must have a child. She has to change her name (from single name to double) and replace her clan” (From focus group, adolescent girls).

Both men and women also spoke about having children as *something that a man “needs” in order to carry on his lineage, and that is important generally for lineage sustainability* – adding further support for the way in which fertility is embedded in patriarchal clan/lineage exchange practices, and in keeping with the male gender role in this exchange. As noted above, the adolescent girls’ focus group respondent, speaking about marriage, said that “she [the wife] has to change her name and replace her clan.” A respondent in a mothers’ focus group said that “...Elders/mother in law wants to see their son’s children because when they become tired/older these children will help them so they wants as their clan become many and many.”

Negative consequences of not having children. As a corollary, if a husband and wife are unable to have a child, serious repercussions can follow including a marriage that is not “peaceful,” disrespect from his family, divorce, or the husband marrying another woman in order to have a child. As is evident in respondent comments, however, the burden and consequences of infertility fall primarily on women. An adolescent female described the situation as follows: “If they have an agreement he can marry other woman, if they were not agreed they can separate. If she may commit divorce and go to her family of orientation, she will not get other marriage because she cannot give a birth.” A mothers’ focus group respondent said that a woman without children is “not respected,” even considered as a “mule.” Even adolescent boys (from focus group) understood that childless women “don’t get any respect.”

After the first child

The bifurcation in attitudes and practices begins after having the first child, at which point there is much more flexibility in regard to family size and spacing decisions, and attitudes towards family planning change markedly. Most respondents, except the HEWs, even referred to contraceptive use after the first child as “spacing,” which at this point is not only an accepted but a highly regarded and trusted practice in this community. Moreover, the issue of spacing is clearly one that has been influenced by the Ethiopian government’s overall HEP – as some respondents even acknowledge. A mother and life history interview respondent said “That time which we used to say ‘I’m satisfied with the God’s gift’ is passed and now I can decide the number of children I want to have.” She connected this transition to healthier children: “Those children whom I got by spacing is physically strong, attractive, and huge and the opposite is true for those I got without birth spacing.” This connection between birth spacing and child health appeared to be widely known. An adolescent boys’ focus group respondent, for example, echoed the theme that before birth spacing was common, children born close together “has been suffering in terms of care, breast feeding, etc.” Another mother and respondent said use of contraceptives for spacing was common, and extolled its virtues: “Now, mother’s life is spared, children are attending school and they are getting proper care. This is the benefit of family planning.”

Spacing was also associated with education and urban areas (qualities of modernity), in contrast to older generations who did not space as much and bore many children. “Why your mother advise you to stop using of family planning?” asked one mother, “I think she is not educated.” An adolescent boys’ focus group respondent explained that “There is a great gap between educated families and not educated. In rural households still they don’t need to limit their children because they think as if not accepting the gift of Allah.” Moreover, educated families, said one midwife and interview respondent, are beginning to make decisions about contraceptive use together.

Some respondents explicitly thanked the Ethiopian government for providing free contraception and the HEWs and HDA for educating women about spacing. A mother (life history interview) said that mothers in the community “appreciate the government for giving them such good things. They say ‘Thanks to this government, it saves us from breastfeeding children year after year and cleaning excreta of children.’” In a mother’s focus group, a respondent underscored this attitude: “It is the government who did this for us. We got health education and discussion within our one to five groups. Even though we came from our father and mother, we got better life now with this changed time. We saw bright day and hope better things in the future.”

Religious influence less determinate regarding spacing. With respect to spacing, the conflict between religious beliefs and family planning was sometimes described as a thing of the past that has been overcome through health education. Said a mothers’ focus group respondent: “Religious leaders, husbands, women as well as community as a whole understood advantage of birth spacing and they all agreed and feel happy about it.” As described by a Family Health Department staff and key informant interview respondent, “Previously in our woreda, what we learned was child or children were thought as gift from God. However, now days, even though they are gift of God, after understanding giving birth in appropriate interval, they understood its benefit for children, mothers, and development/growth of the country. Because of these understandings, the necessity of giving birth in interval is understood by them.”

Some respondents, however, stated that the religious imperative regarding children is still strong and affects contraceptive use in some households. “There are resistant groups present on family planning. For example as some religious person thinking as family planning killing human being. Even we see these groups there were very little in number” (key informant interview, male teacher).

Bifurcation of fertility decision-making

The data on decision-making about fertility reflect the same bifurcation in attitudes and practices described under the first theme, where decision-making for the first child is different than it is with respect to spacing pregnancies and family size decisions after that first child.

Decisions about having children

Following the same pattern, decisions about having children *per se* are inflexible, and are the domain of traditional gender and family prerogatives. Husbands have the most decision-making weight, followed by the husband’s family who expect children to carry on the family name. Many participants mentioned the husband’s family as an influential stakeholder. As explained by a mothers’ focus group respondent, “Because after she gets married she takes them [husband’s parents] as her mother and father. Her mother-in-law and his father have the highest power for decision.” This view was echoed by other respondents, including a Health Education Coordinator who said that “most mothers-in-law also need to be the leader of her son’s house if possible.”

Decisions regarding family size and spacing after the first child

It is at this point, when the obligation to produce a child is fulfilled, that the decision-making process around spacing and family size becomes more fluid, with one key caveat. Husbands still retain a key role in these decisions. Most participants reported that husbands are considered to be the “heads of the household” and the “earners,” so their opinions matter most. At the same time, husbands appeared increasingly supportive of spacing and contraception for that purpose, and are interacting with the HEWs themselves.

Many respondents stated that, after the husband, the couple as an entity was the most influential in decisions about birth spacing and use of contraception. Respondents often referenced this as a positive shift in power and decision-making dynamics in couples, compared to the past. As an HEW (key informant interview) said, “There is also good change regarding decision making in family planning utilization as it is mostly involves both wife and hus-

band.” A mother’s focus group participant described the change: “Now the time is changed and by discussion between husband and wife they are limiting their number of children.”

This view was often connected to a discussion of resources available to support additional children. As a boys’ focus group respondent noted, “What matters is the resources they do have, first they have to discuss and agree about having the next child.” This parallels what was discussed in an adolescent girls’ focus group: “So, both of them [husband and wife] should agree on the issue of having another child. For instance they may talk about their resources that enable them to give appropriate care for both the first child and the other newly born baby” An adult male focus group respondent said, “They can have an agreement since the child reached three years old. They might discuss about; are the resources we have are sufficient enough for nurturing and caring for additional child? Then, if the resources suffice for their expectation they can discuss and decide on the issue.”

Friends, family, health workers and other community members (including imams) were also mentioned in connection with spacing and family size decisions. In addition, friends and their children can also be invoked as a form of normative peer pressure, where the mother and father can urge their son/daughter to have more children like their friends have.

A small number of respondents stated that women exerted the most autonomy over their reproductive health, but this was not a commonly held view. There were indications, however, that women may be gaining some degree of control in these decisions, a finding actually supported by some of the men who were interviewed. Only one life history interview was conducted with a woman who had no children (there were only two women with no children in the entire *gare*). In her view, “It is my personal decision [to wait to have my first child]; I have not discussed this issue with anyone.” In an adult men’s focus group one respondent said, “But now, even if the husband and wife have no agreement, the wife can go to the health center and take Depo [referring to Depo-Provera].”

Contraceptive knowledge and practices

Awareness of modern contraception was high among all respondents, and most respondents also stated that the community was generally knowledgeable in this respect, especially among more educated community members. A mothers’ focus group respondent said, “You know, it was great problem in the past when we didn’t know. But, now we are spacing our births and most women are doing so in our community.” In the adolescent boys’ focus group, a respondent advocated continued education, “because the dwellers [sic] still need continuous awareness/advice to improve their progress of using contraceptives.”

In the adolescent girls’ focus groups, all respondents stated that they were aware of contraception but discussed the benefits in reference to married women, not themselves. While respondents were not explicitly asked about adolescent attitudes and use of contraceptives, one HEW and one midwife discussed their differing perceptions. The HEW reported that adolescents were not using contraception regularly, and that more attention should be paid to increasing their knowledge of and access to contraceptives, rather than solely focusing on married women. “Greater work should be conducted on unmarried female adolescents. We are late. They get some information at school and from health extension professionals working in the community. But adolescents visit health facilities when they are faced with problems rather than prevention.” In contrast, a midwife stated, “Family planning among adolescents is common and they also come back to talk about its side effects with us...In general, they are benefiting from family planning and they have positive attitude towards using contraceptives.”

Some participants expressed beliefs that prolonged contraceptive use can negatively affect fertility. Other participants stated that a common reason for not using or discontinuing contraceptives is concern about side effects that women often hear about through their social networks. As explained by a life history interview respondent, “Using contraceptives before giving birth frightened me, because I took them for a long time, so I didn’t know whether I could bear a child or not.”

Family planning sources of information

For purposes of discussion, these sources can be categorized as formal and informal, where the former refers to individuals with official (government) positions, and the latter to unofficial social network members. The involvement of individuals with official designations in the dialog regarding fertility represents further evidence concerning the impact of the government-led, top-down effort on ideational changes, even in rural areas.

Formal sources of information

The HEWs emerged as key sources of information regarding decisions about healthy spacing of children – again, after birth of the initial child. This represents a significant shift from previous patterns of influence. In the men’s focus group discussion, one respondent said, “Previously people consult traditional midwifery which resulted in so many problems but now they [women] don’t discuss the issue with their family or relatives. Rather they talk with the health workers. So they even discuss the secrets that they don’t talk to their husbands with these health extension workers.” Respondents overwhelmingly reported that they received contraception information from the HEWs, by visiting the local health post, or through participating in “one to five” household networks that are part of the HDA. This was viewed as a recent and positive change within the community, and directly attributable to the HEWs who provide advice and conduct meetings.

Several key informants described how the schools, in their view, serve as a dissemination channel to adolescents. However, these respondents provided contradictory portrayals, indicative of a gap between ideal or public representations and actual practice. For example, a high school teacher in the nearest town was quite sanguine about the role of multiple media and communications channels in reaching adolescents: “The community gets information about family planning from health extension workers and students get awareness in school; we have a club to give information in our school. We use mini media through poem fiction and drama to increase awareness in our students.” One midwife concurred with the role of schools in providing information, but expressed concern regarding the translation of information to practice: “Again, adolescents have awareness. We advise them in the school but they don’t use. They are afraid of taking contraceptives from health center. Therefore, we observe them when they come to the health center for abortion. The problem is not with learning about the use of contraceptive but with implementation to use.” This is not in conflict with the view of an HEW, noted earlier, who did not think that what students received at school was enough.

Informal sources of information

In addition to the formal sources of information, many participants described the circulation of information on contraception and fertility via close friends, family members, and, to a lesser extent, the media. While there are not sufficient data from this study for an evidence-based assertion, some of these informal channels may also represent a more recent pattern that is influenced, again, by the penetration of government efforts and the ways in which these efforts have generated dialog and increased the information flow. Others may represent existing interpersonal networks that are simply disseminating new information. An HEW who discussed adolescents’ ability to make decisions for themselves explained that “now days generations have a better understanding as they use different media, they have different educational opportunities. As a result of these they have a power to decide by themselves.” At the same time, a religious leader and interview respondent described a pattern that is most likely longstanding, in which women “get the information from each other. They hear how someone limits children from each other.”

Notably, information from these channels is not necessarily positive; it can support or cast doubt on the benefits of modern contraceptive use. Some respondents, for example, mentioned the diffusion of (mis)information about side effects. The Health Education Coordina-

tor (key informant interview) referred to this phenomenon: “Every member of a community in this village has good awareness and believes in the benefit of contraceptive use. But, as I told you earlier we have challenges. For example, if one of women faced side effects of contraceptives she is taking, she will tell the scenario by exaggerating the situation to other women and that makes others not use them.”

There were also significant discrepancies in respondent descriptions of the overall information environment, where most respondents did not describe the highly varied array of sources as presented, for example, by the HEWs or the high school teacher. Observational data corroborates this, as there was little evidence of electric power to support multiple media in the kebele.

Not surprisingly, older generation members were *not* listed as sources of information about modern contraception. Mothers, fathers, in-laws, and community elders, influence decisions about when and how many children to have, but they were not identified as sources of information, rather as influencers.

Observational data

The observational notes and photographs helped to contextualize other data, and several observations are relevant. First, households in the kebele were not clustered but diffused, connected by a network of small dirt trails. The health post was located on one of the dirt roads that ran near the kebele. Second, there was little evidence of electrical power, save for a few makeshift lines that appeared to have been informally connected to external power lines. Both these observations underscore the importance of interpersonal communication as a means of disseminating information, and that is exactly what the HEWs do. The first author personally observed that the local HEW was very active and well-known by residents.

While the land is lush during the rainy season, the level of poverty is high, and housing is primarily mud-wattle huts (some with corrugated metal roofs), and cattle pens made of thin branches. Households have small plots of land where residents grow maize, some coffee, and if possible, khat – the most lucrative of the crops as described by kebele residents and a stimulant as well as psychotropic plant. Residents take these crops, along with goats, down to the market in the nearby town on Saturdays to sell, very likely one of the most common opportunities for interaction with people outside the kebele. The town is also the site for the health clinic. To get to the town, however, involves a long walk (especially if carrying anything), or riding on the back of small motorcycles driven by enterprising young men as a kind of taxi service.

DISCUSSION

The data portray a transition in family planning attitudes and practices that is the outcome, to a significant degree, of a well-funded government effort to reduce fertility rates. While top-down in its planning and support, the HEP is carried out by a sizable, decentralized HEW network and implementation of volunteer-based HDA families that serve as social models and attitudinal “change monitors” at the community level. This change is occurring in a rural area that is, in the case of this study, largely Muslim, and whose residents are typically Oromo – the largest ethnic group in Ethiopia. Yet this nationwide effort has managed to generate change in ideation and practice that appears sustainable due to its wide adoption, and because it has become embedded in community social networks. Moreover, the change in practice is accompanied by a discourse of child development, health, and even, to some extent, national development themes.

Knowledge about modern contraception in this small, rural site is high, and use is widely accepted, across age and gender categories. The HEWs are the major source of information about this and other health issues, supplemented by schools and other media for adolescents, and by the HDA-led one-to-five networks. The HEWs hold regular meetings and discussions

– even with religious leaders, and as members of the community themselves, are a constant presence. In this sense, they embody key characteristics of change agents long noted by Rogers (44), including *homophily* – where change agents come from backgrounds similar to the communities in which they are working, thereby increasing trust. Other information sources, such as interpersonal communication among friend and family networks, are less reliable, and can disseminate negative as well as positive information about modern contraception. The limited availability of mass media in this area very likely accentuates the role of the HEWs and interpersonal communication channels.

CONCLUSIONS

The success of the Ethiopian government's HEP, while clearly evident, is at the same time limited by deeply rooted cultural constructs about gender, lineage, childbearing as an exchange and a marriage requirement, and for some individuals, childbearing as a representation of divine will. For these reasons, results from this study show that ideation and practice regarding modern contraception, and changes in decision-making social networks, *have occurred primarily with respect to spacing and family size decisions after an initial child*. While this limitation does not mean that fertility reduction efforts will not show success, it is a reminder that any such program will be engaged with complex, deep-rooted and enduring cultural practices, social structures, and gender hierarchies that form the social ecology of fertility. In addition, while information levels and awareness about modern contraception are high among adolescents, there are other barriers to utilization that have not been fully addressed. The use of modern contraception by adolescents may pertain to pregnancy termination as well as pregnancy prevention; however, we do not have sufficient data in this study to address this issue.

How generalizable are the results of this study and the pattern of social change captured in the data? This is a significant question, on several fronts. First, the entry of the HEWs into community and household-level decision-making networks, and the general loosening of these networks post-first-child is an outcome of a truly substantial, well-funded effort that has come about largely because of the important geopolitical role of Ethiopia and the consequent surfeit of development aid it has received. Ethiopia's attractiveness in this regard may also be influenced by its unique history in sub-Saharan Africa as a centrally-governed nation that was never colonized and thus less affected by lack of a long national narrative and the kinds of cohesion barriers common to nations whose barriers are arbitrary colonial legacies (though Ethiopia has other, historical internal conflicts). Moreover, there is clearly a strong determination on the part of the central government to extend and improve health care and outcomes. Thus, at a fundamental level, replication of an effort in low or middle income countries on this scale is only likely when there are substantial sources of external funds along with the internal political will. In addition to Ethiopia, other large national efforts in sub-Saharan Africa that have demonstrated success, such as in Rwanda and Malawi (45), have come about largely because of major external funding from specific global initiatives such as PEPFAR. National family planning efforts in both the latter countries have included some form of vertical mobilization of resources and people, down to the community level. At the same time, much of the evaluation data on successful approaches comes from smaller-scale interventions (46). Finally, the social network data on fertility decision-making from this study may reflect a generalizable pattern within Ethiopia, though the degree of HEW and HDA penetration in more remote rural areas, or among nomadic peoples in, for example, the Afar region of Ethiopia, may be limited.

There are other potential factors at work in Ethiopia's fertility transition that were not investigated in our study, though some observational data may be suggestive. The study was conducted in a major coffee-growing region of the country. Yet it did not appear that the kebele where this study was situated had much connection to that industry, and among the households that participated, coffee was but a minor crop, behind maize and khat, both of which are sold to broader markets. Any change in the integration of these rural villages into

the highly globalized coffee market could serve as an important vector of change with respect to other social and cultural practices. We also did not collect data, but only heard anecdotally, about labor migration, particularly among adolescents. The degree to which any such movement among residents exists could impact change as well, through exposure to other social environments.

In general, at the level of village or community, this research adds support to a health extension/community health worker model that has accumulated evidence of effectiveness with respect to health promotion tasks over a long period of time and with multiple health issues, particularly in the area of children's health (47). At the national level, however, the sheer size, scope and coordination behind the HEP in Ethiopia would not be possible without the combination of political will coupled with the unique confluence of external factors underlying the substantial resources required to conduct this effort.

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