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Implementation of community-level quality improvement in southeastern Tanzania: a mixed methods process evaluation of what worked, what didn't, and why?

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Declaration

I, Tara Tancred, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Signed:

Date: 30/11/15

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Abstract

Background: In Tanzania, maternal and newborn health outcomes have been slow to improve. The Expanded Quality Management Using Information Power (EQUIP) project was carried out in Tandahimba district from November 2011–April 2014. EQUIP engaged village volunteers in quality improvement processes in which they problem-solved around key issues related to maternal and newborn health in their communities. Examples of community-level quality improvement are rare and there is little documentation of these.

Aim: To explore the implementation of community-level quality improvement in-depth, identifying its facilitators and barriers; to analyse community-level quality improvement within the context of community participation; to determine influencers of birth preparedness and health facility delivery; and to evaluate user perspectives around perceived quality of maternal and newborn health care.

Methods: A mixed-methods process evaluation in four villages (November 2012– November 2013). A continuous household survey provided quantitative data around household behaviours and perceived quality of care.

Results: Mentoring and coaching were required to strengthen volunteer capacities to do quality improvement. Support from village leaders, regular volunteer education, and use of local data were key facilitators of the intervention. Community participation was high with some indication of empowering processes. Volunteer-targeted practices like birth preparedness and health facility deliveries were carried out by a majority of women (95% and 68% respectively). Common reasons for these practices included education around their importance from multiple sources; feeling that making birth preparations would positively impact care received; and male involvement. Qualitative data highlighted instances of disrespectful or abusive care, suggesting improvements in quality of care are still needed.

Conclusion: Village volunteers readily participated in EQUIP. With support, volunteers were able to use quality improvement to contribute positively to changing care-seeking and other behaviours around maternal and newborn health. However, improvements in care-seeking must be accompanied by improvements in quality of care.

Contribution of this Thesis

With the exception of Chapter 6 and part of Chapter 7, which relied in-part on secondary data from a continuous household survey, all of the remaining results presented in this thesis are from primary data collected by the author. The study of community-level quality improvement described herewith was conceptualised and implemented by the author, although much of what was studied were the activities of the EQUIP intervention, within which this study was situated.

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Figures and Tables

Definitions Used Throughout this Thesis

As there are several concepts presented throughout this thesis that are multi-dimensional or without a universally agreed definition, I have defined these terms below, as they have been understood within this thesis, or as they relate to community-level quality improvement.

Community: a group of people within a geographical area set by boundaries defined politically as villages

Community-based: Any programme or intervention that is situated within a community. These programmes or interventions may be community-led or simply occurring at the community level, led by an outside organisation.

Community Health Worker: community members who are chosen—either by community members or outside organisations—to provide primary health care services to their community

Community-level Quality Improvement: Quality improvement (see definition below) activities that are carried out in part or in full *by community members*. The goals of community-level quality improvement are to improve conditions at the community level, either by focussing on changing community-level practices, or the practices of community health workers or health facility staff who impact community health outcomes.

Community Participation (within EQUIP): engagement of community members in the planning, implementation, monitoring and evaluation, and leadership of community-level quality improvement processes to the greatest extent possible

Process Evaluation: A study design that can be used to explore the implementation of a programme or intervention in-depth. It may be draw on frameworks in order to help organise data collection and analysis and typically draws from multiple methodological approaches in order to produce data.

Quality Improvement: A problem solving technique in which stakeholders are engaged from the bottom-up in identifying key issues within a process and then designing, implementing, and monitoring solutions—called change ideas—to those issues. Primary methodological approaches used will likely include plan-do-study-act cycles annotated run charts. An aspect of quality improvement that is of importance, although not universally used, is the testing of change ideas on a small scale to ensure that they convey improvements before implementing on a larger scale. Resources used to implement change ideas are typically drawn from what is locally available to the greatest extent possible, without relying on external contributions.

Chapter 1

Introduction

This chapter provides background information about the quality improvement intervention that this PhD work was a part of. A review of quality improvement in Sub-Saharan Africa is then provided, emphasising instances of community-level quality improvement. The potential of quality improvement to lead to better health outcomes and improvements in care, with evidence to suggest that it is well-suited to low-income country contexts and is increasing in Sub-Saharan Africa, is presented. Concepts around community participation, primary healthcare, and participatory interventions in maternal and newborn health are summarised. The Tanzanian health system and current policy around community health workers and maternal and newborn health is then outlined. The contribution of this thesis to providing a robust evaluation of community-level quality improvement processes that can be used formatively in other settings is highlighted throughout.

Background

Maternal and newborn mortality rates throughout much of Sub-Saharan Africa remain unacceptably high.(1, 2) Many Sub-Saharan African countries failed to meet Millennium Development Goals 4 and 5a, to reduce child and maternal mortality respectively.(3) Although non-health systems factors may have a substantial influence, health systems factors such as constrained resources and limited technical capacity of health facility staff to provide care, especially for obstetric emergencies, have been identified as significant contributors to both maternal and newborn mortality.(4-10) Furthermore, under utilisation of or poor access to health services in many Sub-Saharan African settings is associated with elevated maternal and newborn mortality.(11-13) As such, there is a need for improved quality of maternal and newborn health services as well as increased use of health services in these settings. Although there are multiple definitions,(14) throughout this thesis, quality will refer to the definition in the World Health Organization's "Quality of Care: A Process for Making Strategic Choices in Health Systems", which defines quality health care as being effective, efficient, accessible, acceptable and patient-centred, equitable, and safe.(15)

An Overview of the EQUIP Intervention and Quality Improvement

The Expanded Quality Management Using Information Power (EQUIP) intervention was a complex public health intervention carried out in Tandahimba district in southeastern Tanzania and Mayuge district in eastern Uganda from November 2011–April 2014.(16) EQUIP was a research study led by Ifakara Health Institute in Tanzania and the Makerere School of Public Health in Uganda. Together with colleagues from the London School of Hygiene and Tropical Medicine (England), EvaPlan (Germany), and Karolinska Institutet (Sweden), an EQUIP study consortium was developed. This thesis will only address the Tanzanian intervention within EQUIP.

The aim of EQUIP was to improve the supply of and demand for quality maternal and newborn health services. Impact on maternal and newborn morbidity and mortality as well as secondary outcomes around healthcare provision, community-level practices, and care-seeking were evaluated. At the time of writing of this thesis, a results paper of the EQUIP intervention is in preparation. However, some of the key findings are shared in Table 1.1 below.(17) These results compare indicators across six rounds of data collection (one being baseline, six being endline) from a continuous household and

health facility survey in the intervention (Tandahimba) and comparison (Newala) districts. Improvements with strong evidence of the contribution of EQUIP to these include the administration of a uterotonic (oxytocin) within one minute of birth, a clean birth kit being available for women (restricted to home births), and frequency of supervision to health facilities.

Table 1.1 Summary of unpublished key results from the EQUIP intervention

	N (Six rounds)		Intervention district (95% CI)		Comparison district (95% CI)		Estimated difference-in- difference (95% CI)	
Institutional delivery	1422*	baseline	55	(45–65)	62	(50–72)	7	(-7–21)
		endline	87	(77–93)	78	(67–86)		
Immediate breastfeeding	1398*	baseline	31	(22–42)	32	(21–46)	-7	(-21–7)
		endline	37	(28–47)	40	(30–52)		
Uterotonic within one minute of birth	409**	baseline	52	(32–71)	72	(52–86)	38	(20–57)
		endline	94	(82–98)	89	(74–96)		
Knowledge of critical danger signs in pregnancy	1422*	baseline	25	(18–33)	40	(30–51)	4	(-11–18)
		endline	45	(36–54)	45	(34–56)		
Knowledge of critical danger signs for newborns	1422*	baseline	36	(29–45)	35	(26–45)	2	(-12–15)
		endline	38	(30–48)	34	(26–43)		
Post-partum care given within seven days (restricted to home births)	442*	baseline	19	(11–30)	27	(14–47)	17	(-8–40)
		endline	23	(10–46)	23	(7–54)		
Clean birth kit present for birth (restricted to home births)	442*	baseline	15	(7–29)	23	(13–37)	31	(2–60)
		endline	62	(23–84)	23	(11–41)		
Wrapping of babies (as part of neonatal resuscitation)	1288*	baseline	43	(33–53)	44	(34–56)	7	(-21–36)
		endline	56	(48–65)	33	(25–44)		
Infection prevention items available	352***	baseline	13	(4–34)	48	(27–67)	21	(-4–46)
		endline	69	(50–83)	76	(58–87)		
Supervision to health facilities (at least once in the past six months)	354***	baseline	78	(57–91)	92	(73–98)	14	(0–28)
		endline	100		100			

* N = women who had a live birth in the past year prior to the survey
** N = births among women in the past year prior to the survey in which oxytocin was used
*** N = health facility assessments

Quality management is a term that is used to describe the collective quality *improvement* processes that are used to improve a system, and has been applied across sectors. Within EQUIP, improvements were made through the engagement of stakeholders within a process using plan-do-study-act (PDSA) cycles, popularised by W. E. Deming and first used in the Japanese automotive industry.(18, 19) PDSA cycles help stakeholders within a process to: identify problems (plan); create and implement strategies—called change ideas—to address those problems within the confines of the resources at their disposal (do); test those strategies to see if they worked (study); and finally, adapt, abandon, or adopt those strategies according to the outcome of testing (act). Adapting these change ideas simply refers to modifying them until they work. Abandoning change ideas occurs when it is obvious that no improvements are being made as a result of their implementation, in which case an entirely new change idea

would be generated. Adopted change ideas are those that have led to improvement and are then routinely carried out, provided that they continue to result in or sustain improvements. Within a healthcare setting, strategies may involve getting staff behaviours to more closely align with guidelines for case management, for example. Adopted strategies are then continuously monitored and evaluated to ensure that improvements are being made and maintained, typically through the use of monthly performance graphs called run charts.

There are multiple quality improvement methodologies. In EQUIP, the collaborative approach from the Institute for Healthcare Improvement, which was adapted from Langley's "The Improvement Guide: A Practical Approach to Enhancing Organizational Performance", was used.(20, 21) The collaborative approach is founded on the following three questions as PDSA cycles are used: What are we trying to accomplish? What changes can we make that will result in an improvement? How will we know that the change is an improvement?(21) Furthermore, this approach suggests the creation of learning collaboratives at each level. Learning collaboratives bring people carrying out quality improvement together so that they can share experiences and exchange best practices, often highlighting which change ideas have worked particularly well.

EQUIP applied quality improvement within the health system of Tandahimba district in Tanzania at the district, facility, and community levels. The multi-level design acknowledged that changes across all three were necessary if sustainable improvements in maternal and newborn health were to be made (see Figure 1.1). At the district level, local health managers like the district reproductive and child health coordinator, the district medical and nursing officers, and others were trained and supported in quality improvement by EQUIP staff. Here the emphasis was on making higher-level improvements, such as better resource allocation for maternal and newborn health services. District-level staff also helped supervise health facility quality improvement teams alongside one EQUIP staff member. Only one quality improvement team was created at this level, so there was no learning collaborative established.

District-level quality improvement team

Participants (one team)
District-level council health management team members

Aim
To overcome higher-level barriers (e.g., human resource shortages, procurement and supply chain management) to improved maternal and newborn health

Activities
- Participate in learning sessions (quarterly)
- Generate, test, implement, and monitor change ideas (ongoing)
- Provide supportive supervision of quality improvement activities within health facilities

Health facility-level quality improvement teams

Participants (34 teams)
One or more reproductive and child health staff from all 34 health facilities in Tandahimba. Each facility team belonged to one of three quality improvement collaboratives in the district

Aim
To overcome facility-level barriers (e.g. lack of timely administration of oxytocin, improper neonatal resuscitation, no post-natal care, and poor care-seeking) to improved maternal and newborn health

Activities
- Participate in follow-up meetings with EQUIP and district-level staff (at least one–three times per quarter)
- Generate, test, implement, and monitor change ideas (ongoing)
- Collaborate with community-level quality improvement teams from each health facility's catchment area (monthly during **community-level** follow-up meetings)

Community-level quality improvement teams

Participants (157 teams)
Two volunteers from each of 157 villages in Tandahimba. Each village team belonged to one of 10 clusters. Each cluster belonged to one of three quality improvement collaboratives in the district

Aim
To overcome community-level barriers (e.g. poor care-seeking, improper household level practices) to improved maternal and newborn health

Activities
- Participate in learning sessions (quarterly)
- Participate in follow-up "cluster" meetings (monthly)
- Generate, test, implement, and monitor change ideas (ongoing)
- Collaborate with health facility quality improvement teams (monthly during cluster meetings)

Supports

Supports

Figure 1.1 Participation, aims, and activities of the district, health facility, and community level quality improvement teams within EQUIP

At the facility level, the emphasis was on improving the quality of maternal and newborn service provision. In the 34 health facilities in Tandahimba district, including three health centres and the district hospital, one or two health facility staff at each were trained in quality improvement throughout the implementation period by both EQUIP staff and mentors from the district quality improvement team. The staff undertaking quality improvement constituted the "team", even if it was only one staff member. These staff members were typically those most engaged in reproductive and child health. At health centres and the hospital, these included the facilities' reproductive and child health coordinators. At dispensaries, the staff member(s) who led the majority of antenatal, birth, and postnatal care activities were engaged in quality improvement. Three collaboratives were established at the health facility level, with the 34 teams distributed between these.

Finally, at the community level, two volunteers selected by community members across the district's 157 villages were also engaged in quality improvement activities. Here the emphasis was on improving care-seeking and household-level maternal and newborn health practices. EQUIP's community-level quality improvement processes are outlined more extensively in Chapter 3. Volunteers in each village created a quality improvement team. There were 10 "clusters" of teams each representing 15–18 villages that were supervised by government-employed extension workers. An overall district community-level quality improvement mentor—a government-employed community development officer—and one EQUIP staff supported extension workers and volunteers. Every three-to-four months, teams at each level came together in their quality improvement collaboratives for learning sessions in which they received information about key topics related to maternal and newborn health, and support in identifying problems and creating change ideas to address these. Three collaboratives were also established at the community level with the 157 village teams distributed across each: Mahuta (50 villages), Namikupa (58 villages), and Litehu (47 villages).

This PhD focussed on community-level quality improvement (highlighted in orange in Figure 1.1). Within communities, key topics were prioritised from the outset of the intervention. These topics were derived from the Partnership for Maternal, Newborn and Child Health's "Essential Interventions, Commodities and Guidelines for Reproductive, Maternal, Newborn and Child Health".(22) These topics included: the importance of facility delivery, making birth preparations, knowledge of and care-

seeking for maternal and newborn danger signs, and preventing infections during labour and the post-partum period. Owing to the large number of teams at the community level, monthly meetings for each cluster were also held, both to reiterate any concepts from learning sessions that were not well understood, and to provide further opportunities for peer learning. Health facility staff were also invited to these meetings to: encourage dialogue between community members and health facility staff, provide an opportunity for collaboration wherever possible; and enable greater understanding between both about the activities carried out at each level.

EQUIP had a quasi-experimental evaluation study design and collected outcome data from both the intervention district (Tandahimba) and a neighbouring comparison district (Newala). For this purpose a continuous household and health facility survey was carried out in both districts. Data were collected from households about: socioeconomic characteristics like the material the house was built from, the source of water, whether there was ownership of a bicycle, animals, a television, or a radio; and a list of residents. Among households with resident women aged 13–49, data were collected on family planning, past and current pregnancies, past and present health-seeking practices, past or present maternal and newborn care practices, and perceived quality of healthcare. Health facility surveys included a facility readiness component (assessing facility resources, staff training, supervisory visits, number of deliveries, and outcomes of deliveries), and also collected data from individual facility staff (particularly assessing facility preparedness, use of emergency obstetric care procedures at the last delivery they attended, and staff knowledge of other standardised care procedures).(23) Both the household and health facility surveys were administered over six rounds of data collection, each round representing a three-month period. Approximately 1200 households in each district and all (34) health facilities were surveyed in each round between November 2011 and April 2014. In the intervention district only, relevant data from the continuous survey were also summarised into report cards that were used by quality improvement teams in addition to the real-time data they collected on run charts to monitor their quality improvement work.

Other Community-Based Maternal and Newborn Health Interventions in Tandahimba District

There were two other known community-based maternal and newborn health interventions taking place in Tandahimba district alongside the EQUIP intervention. These included Ifakara Health Institute's Improving Newborn Survival in Southern Tanzania (INSIST) intervention and a community-based education and sensitisation programme led by the African Medical Research Foundation. The INSIST intervention trained community-based volunteers around various aspects of care during pregnancy, birth, and the post-partum period. Volunteers visited the homes of pregnant and recently delivered women to provide education around care-seeking, including early and consistent attendance of antenatal care, institutional delivery, and facility attendance if any signs of infection to the mother or newborn were noticed post-partum. Other practices such as birth preparedness and immediate and excusive breastfeeding were encouraged. INSIST concluded in 2013 and was present in half of the villages in Tandahimba (personal correspondence with Elibariki Mkumbo, a member of the INSIST field staff). The second programme engaged community health workers in the provision of information to households of pregnant women around institutional delivery. These community health workers also provided village-level sensitisation around malaria prevention (personal correspondence with Aloyce Masau, Project Assistance Officer).

Quality Improvement in Sub-Saharan Africa

A working group met in 2008 to discuss the applications of quality improvement in low-income countries. This group summarised expected benefits using quality improvement in low-income country settings framed by the World Health Organization's six health system building blocks:(24) (p.239)

- Service delivery: it closes the quality gap between actual and achievable practice
- Health workforce: it enhances individual performance, satisfaction, and retention
- Information: it encourages the development and adoption of information systems
- Medical products and technology: it improves the appropriate, evidence-based use of limited resources
- Financing: it helps to optimise the use of limited resources and reduce the cost

of financial transactions

- Leadership and governance: it strengthens measurement capacity, stewardship, accountability, and transparency

Further, Smits et al suggest that quality improvement may be even better suited to low-income countries than high-income countries owing to the pre-existing foundation of teamwork that may exist, and engagement of the community within quality improvement more likely owing to the inherent position of community structures within healthcare.(25) Heiby also pointed to the value of quality improvement in strengthening African health systems in particular. He emphasised the need for countries to contribute to ongoing learning and sharing of best practices and lessons learned.(26)

However, there are also limitations to quality improvement that are more likely in low-income country settings. For example, a large hospital in Malawi failed to establish a quality improvement culture, citing staff and resource shortages, a lack of documentation, and poor communication within and between cadres of facility staff as primary constraints.(27) Durand has suggested that, amidst likely system failures common in low-income country settings, freedom to pursue higher-level health service needs like innovation and quality improvement is simply not available. He further criticised quality improvement initiatives—especially those championed by experts from high-income settings—as tending to fall within too narrow a scope of interest, rather than addressing whole-system operational quality. He suggested that, by highlighting problems and pointing to solutions, quality improvement simply adds more tasks to an already impossible list, which negates potential for improving quality.(28) Umar et al have also highlighted the unfeasibility of quality improvement projects in low-income country settings adopted from high-income settings, especially those focussed on high-level impacts. Rather, the authors suggest a "little-steps" approach—not unlike the iterative use of PDSA cycles in EQUIP—in which the overall impact of the project is the cumulative impact of smaller-scale achievements.(29)

Despite a large body of literature around quality improvement, there remains a considerable gap in terms of what is known and published from low-income country settings. Within these settings, there is a distinct lack of process and impact data obtained from high-quality studies in which appropriate comparison groups have been used.(30)

For the purpose of this thesis, a critical literature review of available evidence around quality improvement in Sub-Saharan Africa was carried out. From this review, the overall objective of the quality improvement work, the quality improvement methods used, who carried out quality improvement activities (e.g. health facility staff, administrators, community members), what level the activities were aiming to improve (e.g. health facilities, communities), and what was reported (e.g. process and/or outcomes) were documented (Table 1 in Appendix 1). Medline/PubMed, EMBASE, Global Health, CINAHL, Web of Science, and Google Scholar were searched for scientific literature. Google, Grey Source, Research for Development, Sci Dev Net, and World Cat were searched for grey literature and relevant dissertations and theses. As quality improvement focusses on problem solving, there are many interventions that could arguably considered "quality improvement". In order to limit my literature search to a manageable level, the following inclusion criteria were also set, and examples of programmes or interventions that did not meet these were excluded. To be included, the programme or intervention must have:

1. been self-identified by the authors as quality improvement, total quality improvement, continuous quality improvement, or quality management;
2. had a component of problem identification;
3. had a component of solution-generation and implementation, which was the responsibility of those identifying problems;
4. had a component of testing and/or monitoring of solutions, which was the responsibility of those generating and implementing solutions; and
5. had an explicit mention of methodologies used.

Methodologies such as PDSA cycles, use of run charts, or using the collaborative model for improvement in particular were included. It should be noted that many quality improvement initiatives might simply take place within organisations as part of managerial strategies, and may not be documented, so this table likely does not represent the full scope of quality improvement activities being carried out in Sub-Saharan Africa.

At the community level, quality improvement interventions or programmes must have met the same criteria as above, although with the explicit indication that those responsible for quality improvement activities were community members. Literature around community-based programmes to increase health facility accountability and many programmes that utilise community health workers in trying to respond to

context-specific issues are tempting to include given their insistence on community-based problem solving.(31-33) However, most of these: do not self-identify as quality improvement; lack a component of testing solutions; and do not always have the same individuals involved in problem identification, creating solutions, implementing solutions, and monitoring solutions.

Overall, 30 quality improvement interventions were identified (Appendix 1). These projects were carried out from 1994 until June 2015 in 14 countries (Uganda,(34-36) Kenya,(35, 37-39) the Democratic Republic of Congo,(40) South Africa,(41-47) Zambia,(48, 49) Ethiopia,(50-52) Niger,(53, 54) Malawi,(55-57) Mali,(53) Benin,(58) Rwanda,(59, 60) Ghana,(61-65) Tanzania,(66) and Zimbabwe (67)). An increase in the number of quality improvement interventions in Sub-Saharan Africa has taken place over the past ten years. Five interventions started within the period of 1994–2005, and 23 started from 2006–2013, with two interventions that did not have an indicated start date.

Of the projects listed in Appendix 1, 25 were carried out with the intention of improving quality at health facilities, and five were carried out with the intention of strengthening the performance or retention of community health workers (understood here as community members who are chosen—either by community members or outside organisations—to provide primary health care services to their community). At health facilities the most common areas of improvement were scaling up of services, treatment and care for HIV-positive individuals, prevention of mother-to-child transmission of HIV, maternal and newborn health, and various components of primary health care. Much of the data from these interventions came from before-and-after studies or case studies. However, all of the 27 interventions that reported on primary and secondary outcomes saw improvements that authors believed were attributable to the quality improvement activities undertaken. Although more robust evaluation designs would help to confirm the strength of these findings, there appears to be evidence that quality improvement holds promise as an intervention that can strengthen health services and provider performance, leading to better health outcomes.

Of these 30 interventions listed in Appendix 1, 19 brought different cadres of health facility staff together on quality improvement teams, sometimes with managerial staff or administrators. In three instances, health facility staff and community members were

brought together.(35, 40, 59) Three quality improvement projects were carried out exclusively by community members.(51, 52, 58) Two projects were led by administrators or higher-level decision-makers.(38, 42, 57) Two examples were led exclusively by external organisations.(63, 67, 68). Finally, one example was led by Jhpiego and the Zambian Defence Force together.(48)

Community-level quality improvement and reporting on process
An example of community-level quality improvement with rigorous monitoring, evaluation, and reporting comes from Vietnam. This cluster-randomised controlled trial, the "Neonatal Health–Knowledge into Practice (NeoKIP) Community-Based Trial", aimed to improve health for newborns by improving practices within the perinatal period. This intervention created 44 maternal-newborn-health groups (MNHGs) that were facilitated by representatives from the local women's union. Women's unions were established in Vietnam in 1930 and host over 13 million members throughout the country with the mandate of pursuing the socioeconomic development of women and promoting gender equality.(69) These groups were made of four local leaders and four local health facility staff. These groups used PDSA cycles to problem solve around key issues they identified for mothers and newborns in their communities.(70) The primary outcome was neonatal mortality, which was found to drop from 24/1000 live births to 16/1000 live births from baseline-to-endline. In the first and second year of the intervention, change in neonatal mortality was similar in intervention (44 randomly selected communities with MNHGs) and comparison (46 randomly selected communities without MNHGs) arms, but the neonatal mortality rate was 49% lower in the intervention arm than in the comparison arm in the third year (OR 0.51, 95% CI 0.30–0.89).(71, 72) Secondary outcomes included behaviours targeted by groups, such as antenatal care attendance, which was significantly higher in intervention communities (91%) than control communities (82%) (OR 2.27, 95% CI 1.07–4.80).(72) A process evaluation of this work was carried out by Eriksson et al, who used routinely collected documents like facilitators' diaries and notes from supervision meetings and focus group discussions with group facilitators from six intervention groups. Over 95% of intended group meetings were carried out with an attendance rate of 86% and only one group became inactive throughout the intervention period. Groups identified 32 problems and implemented 39 activities to address these. Most problems centred around a lack of awareness and attendance of antenatal and postnatal care. Most activities focussed on improving knowledge through home-based counselling, communication in

communities through messaging on loudspeakers and in meetings, and counselling at health centres.(73) Facilitators and barriers were also explored. Groups functioned especially well if facilitators were from the same areas as the group members. Primary barriers were the perception of facilitator's lack of health knowledge, a lack of funds and support, demands on group member time, and the sense that the intervention was slow.(74)

From Sub-Saharan Africa, it is worth giving special note to one of the examples from Malawi.(55) This intervention had facility-level quality improvement activities (called the MaiKhanda Trial), with the overall aim of improving perinatal, neonatal, and maternal mortality. Alongside health facility quality improvement, a community-based women's group intervention was also created (called the MaiMwana Project). These women's groups were engaged in participatory rural appraisal to inform community action cycles in which they identified and strategised around local problems related to maternal and newborn health, in much the same way as EQUIP volunteers did.(55, 75) However, the women's groups lacked training in quality improvement-specific methodologies, and while strategies were evaluated in an ongoing manner, there was no component of testing strategies and formally monitoring them through graphs. Although the authors noted some implementation problems, in clusters receiving both MaiKhanda and MaiMwana, the neonatal mortality rate was 22% lower (27/1000 live births) than in control clusters (34/1000 live births). The perinatal mortality rate was 16% lower in clusters that only received MaiMwana (OR 0.84, 95% CI 072–0.97). There was no effect on maternal mortality.(55) These results highlight how problem-solving across levels, as was carried out in EQUIP, may have important life-saving implications. However, there is limited process data available around the MaiMwana or MaiKhanda interventions.

The study of health outcomes provides much-needed data about the effectiveness of quality improvement, but there is often little detail about why quality improvement failed or succeeded in achieving intended outcomes. Of the initiatives in Sub-Saharan Africa (see Appendix 1), there are few examples of community-level quality improvement and very little documentation about processes. Only one example, from Ethiopia, actually set out to study processes.(52) Other projects simply mentioned some aspects of implementation, such as some of the key lessons learned, or highlighted some of the steps of their implementation, but placed more emphasis on reporting outcomes.

It has been suggested that knowledge of process is particularly helpful in informing quality improvement interventions. Specifically, Hulscher et al indicate that:

> "*Process evaluation is an important tool that can meticulously describe the [quality improvement] intervention itself, the actual exposure to this intervention, and the experience of those exposed. This information is…crucial for understanding the success—or lack of success—of [quality improvement] interventions."*(76) (pg. 40)

In addition, process data may be useful in unpacking evidence arising from impact evaluations, helping to explain positive or negative results, which is considerably more helpful than a standalone measure of impact or lack thereof. Indeed, process evaluations of quality improvement implemented outside Sub-Saharan Africa have provided helpful suggestions for implementation in different settings. These findings have included: barriers and facilitators of the interventions, including sources of implementer motivation; contact time, activity levels, and other measures of implementation strength; and implementer receptiveness.(77-80)

Two considerations about the quality improvement work indicated in Appendix 1 are: who is carrying out the quality improvement and to what end? There are five examples of community-level quality improvement in Appendix 1. All five aimed to improve the performance or retention of community health workers. Four of these actively engaged community members in carrying out quality improvement processes.(52, 59, 81) Therefore, the aforementioned example from Vietnam(70-74) is the most similar type of intervention to the community-level quality improvement activities of EQUIP in that it engaged community members in quality improvement to address demand-side—rather than supply-side—factors, and additionally, it also focussed on maternal and newborn health.

Table 1 in Appendix 1 suggests that there are positive health and service delivery outcomes that may be achieved through quality improvement activities, but the lack of documentation of quality improvement processes and robust measures of outcomes leaves little for future interventions to build from. This thesis provides an in-depth evaluation of the implementation of community-level quality improvement within the EQUIP intervention. The findings have further relevance to literature around community participation, primary health care, and health systems strengthening. The

importance of community engagement in health is highlighted in the sections that follow.

Community Participation in Health

The community level quality improvement processes within EQUIP relied on a high level of community participation. However, "community participation" may take on many meanings, and how it is used and why may differ across settings.

Community participation and primary health care

Primary health care was given international attention in the 1978 Declaration of Alma-Ata, suggesting that it provide essential medical services, be the first point of access to a health system, be socially acceptable, and be universally accessible through the full participation of the community members it serves.(82) Community participation in health was indicated as an integral component of primary health care, which, as it was stated in the Declaration,

> *"requires and promotes maximum community and individual self-reliance and participation in the planning, organization, operation and control of primary health care, making fullest use of local, national and other available resources; and to this end develops through appropriate education the ability of communities to participate"*.(82)pg.2

Since Alma-Ata, primary health care has both lost and gained momentum, most recently being revitalised in the so-called "renaissance" of primary health care championed by the World Health Organization in its publication, "Primary Health Care: Now More than Ever" and The Lancet in its "Alma-Ata: Rebirth and Revision" series in 2008.(83, 84) Both recognised that the tenets of people-centredness and community participation were of particular relevance 30 years after Alma-Ata. Increasing economic prosperity, education levels, and social connectivity seen in many countries, were seen to have contributed to an increasing interest among people to have their say.(83) The Lancet series emphasised investment in primary health care—especially in maternal and newborn health—as a prerequisite for the health systems strengthening needed for many countries to meet the Millennium Development Goals, with reflections on the importance of community engagement to do so.(84)

Primary health care is undoubtedly a critical component of health systems everywhere, but especially in low-income country contexts. In these settings, expenditure on health is often constrained by minimal budgetary allocation to health, and a reliance on funding from external donors, which may be an unsustainable practice.(68) Investment in primary health care can bolster health outcomes, contribute to health systems strengthening, and promote equitable care in low-income countries at lower costs than would be expected of health interventions beyond the primary care level.(83, 85-90) The success of primary health care for sustained improvement, however, is thought to be linked to the active engagement of communities—beyond only rhetoric—as suggested in 1978 in Alma-Ata.(91-94)

Benefits and rationale for community engagement
Community participation is thought to facilitate uptake of health interventions and favourable health outcomes through a number of ways. First, regarding behaviour change, communities create a system of exchange and influence that often dictates the behaviours of the people residing within the community. Therefore, community participation is thought to elicit behaviour change.(95) Second, programs are thought to be more effective if they engage the community to enhance acceptability. If a community does not accept an intervention, there will be limited uptake, and it may actually cause social disruption and harm.(96, 97) Third, community participation can promote sustainability of the intervention beyond the externally funded time period, and may increase cost efficiency.(92, 98) Finally, community participation may empower communities to change the social, economic, and environmental circumstances through which health improvements can be achieved and maintained.(99-102)

Community participation—or community action—was also highlighted in 1986 in the Ottawa Charter for Health Promotion, which states that:

> *"Health promotion works through concrete and effective community action in setting priorities, making decisions, planning strategies and implementing them to achieve better health. At the heart of this process is the empowerment of communities—their ownership and control of their own endeavours and destinies."*(103)pg.3

There are parallels between the type of community participation called for here and quality improvement at the community level. However, when considering "community participation in health", three major barriers limit consensus around a common

understanding of what that means: The first is a lack of consistent definition for "community". It is often not made clear what is implied by "community" in many of the health interventions purporting to be based at the community level. From an epidemiological standpoint, the reference may be a specific area, such as a village, which has distinct geographical boundaries. From a sociological standpoint, considerations may be around the homogeneity of the group and shared interests, experience, or attachment to an area.(104-109) Community participation within EQUIP is discussed in detail in Chapter 5, but briefly here, "community" took on the epidemiological meaning, and boundaries were set as villages.

The second barrier is the understanding of community participation as a means or as an end. Community participation may be seen only as the platform from which a programme or intervention is implemented. The engagement of community members may simply be part and parcel of implementation design. However, community participation as an end is seen to be an empowering process by which communities may undergo social development and ultimately take ownership for their health outcomes and assert influence over the institutions that impact their health.(104, 109-111) Within EQUIP, community participation was seen as a means, rather than an end. Although the goal was certainly to have community members take ownership of the intervention and strive to pursue changes in their communities, their participation was seen as a driving force of the intervention. No overall movements to change power dynamics or incite empowering processes were envisioned from the outset.

Lastly, the third barrier is a lack of consensus on the degree or level of community participation that actually takes place. Both Rifkin and Arnstein have suggested that participation should be viewed on a continuum or a ladder, with varying degrees of participation—typically influenced by the amount of citizen power over and responsibility for a programme or intervention (Figure 1.2).
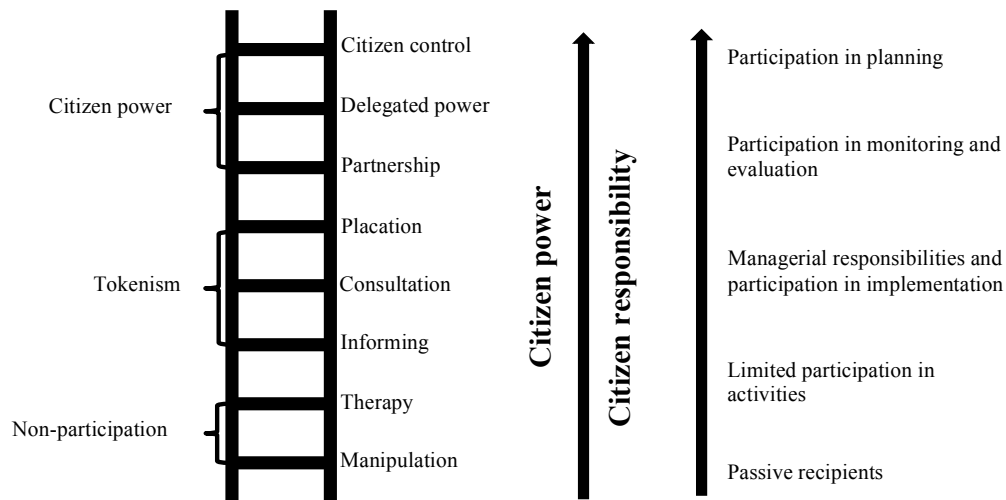
Figure 1.2 Adaptations of Arnstein's ladder of participation and Rifkin's five levels of participation, highlighting increasing levels of citizen power and responsibility

Arnstein's "ladder of participation" is divided into three basic sections: non-participation, tokenism, and citizen power.(112) Higher rungs of the ladder see increasingly more power in the hands of the community, while lower levels see power in the hands of those external to the community.(112) Rifkin similarly indicates that community members can be passive recipients of a programme or intervention up to having agency over what programmes come into a community and which external partners—if any—should be engaged to pursue activities.(113) Unfortunately, many programmes or interventions that strive for community participation may fall at the lower ends of Arnstein's ladder or Rifkin's continuum of participation. A recent review highlighted the tendency of programmes, especially in low-income country settings, to simply have community members implementing decisions that have been passed on from the top-down, despite being described as "participatory".(114) Although EQUIP was externally planned and introduced to communities, the actual change ideas carried out in communities were entirely conceptualised, implemented, and monitored and evaluated by community members, with limited external input. On both Arnstein's ladder and Rifkin's continuum, volunteer activities within EQUIP would lie near the top.

Use of community participation in maternal and newborn health in low-income countries

There is mixed evidence surrounding the effectiveness of community participation-based interventions, predominantly in maternal and newborn health. Below, the use of participatory action cycles, participatory rural appraisal, and participatory evaluation are briefly described. Although these approaches share some features with quality improvement, they are distinct.

The most widely reported participatory approach in maternal and newborn health is the use of participatory action cycles among women's groups. Groups of women met regularly to problem solve around key issues related to the health of mothers and newborns in their communities using participatory action cycles. Participatory action research engages intended beneficiaries in reflecting on their local situation, taking action to make improvements, and collecting data.(115) Schmittdiel et al identified quality improvement as a type of participatory action research and noted that its cyclical, iterative processes are key to sustaining improvements.(116) In much the same light, participatory action cycles are simply a methodology used within participatory action research to emphasise the cyclical and ongoing nature of these actions. In research studies in low-income country settings, women's groups developed local strategies around maternal and newborn health and monitored their impact. These have been used with varying success in Bolivia,(117) Nepal,(81, 118-121) India,(122-126) Bangladesh,(127) and Malawi.(75) A 2013 meta-analysis of the trials from Malawi, India, Bangladesh, and Nepal indicated a 37% reduction in maternal mortality (OR 0.63, 95% CI 0.32–0.94) and 23% decrease in neonatal mortality (OR 0.77, 95% CI 0.65–0.90) with exposure to women's groups. Where coverage was high—when at least 30% of pregnant women were part of women's groups—maternal mortality decreased by 55% (OR 0.45, 95% CI 0.17–0.73) and neonatal mortality decreased by 33% (OR 0.67, 95% CI 0.59–0.74).(128)

Other participatory methods such as participatory rural appraisal and participatory evaluation are much less similar to the quality improvement methods used at the community level within EQUIP, however, the methodologies used within each could be applied to PDSAs. For example, participatory rural appraisal relies on the insights and lived experiences of local people in assessing a particular aspect of their lives.(129) To this end, it has been used extensively in agriculture and is transferrable across sectors.

As such, this type of appraisal could be a valuable precursor to PDSA cycles, helping to identify key problems to work on. In the women's groups described above, very often participatory rural appraisal has been used to identify problems that participatory action cycles should aim to resolve, as was the case in the Malawian MaiMwana intervention described under *Community-level quality improvement and reporting on process above*.(75)

Participatory evaluation has been particularly useful in evaluating social development projects. Like other participatory approaches, community members are engaged, although with the intention to evaluate local projects, explore their strengths and weaknesses, and make suggestions for improved implementation.(130) As within participatory rural appraisal, methodologies used within participatory evaluation could complement PDSA cycles, namely by facilitating the "study" aspect of the cycle. In one intervention in Bolivia, the WARMI project, women's groups also used participatory action cycles with a strong component of participatory evaluation of the activities they implemented in order to improve maternal and newborn health.(117)

1.1 Community Health in Tanzania

Brief Overview of the Tanzanian Health System

The Ministry of Health and Social Welfare governs Tanzania's health system. From there, regional medical officers and management teams oversee the work of council health management teams at the district level. These teams are led by the district medical officers. Council health management teams have the responsibility of determining budgets and resource allocation and overseeing service provision in each district.(131) In further efforts to decentralise, local health governance structures—Council Health Services Boards and Health Facility Governing Committees (called boards and committees hereafter)—were established to encourage community participation in the management of health services. These were established in 1996 with the intention of decentralisation of decision-making for health and education through devolution of responsibilities from the central level. The goal was to have political power reach the lowest levels possible.(132, 133) Community members on these boards and committees were meant to have influence over the planning, budgeting, and implementation of programmes at the community level, and also to monitor service provision.(132, 133) Alongside the establishment of these boards and committees, community health funds were introduced as a means of cost-sharing, and are managed by the committees.(134)

A 2014 review of these boards and committees found that, although well-poised to ensure greater accountability of health managers and providers, overall performance and participation remained low. Where performance of boards and committees was low, their perceived relevance to communities dropped. Particular issues with low performance included: an inability to mobilise funds; failure to replace the boards and committees after their tenure had expired and failure to maintain the needed number of members; failure to set meaningful criteria to exempt the poorest and most vulnerable members of communities from the community health fund or paying for services, which is meant to be within their mandate; and inadequate monitoring of these (which is done by the districts), which led to a failure to incorporate their suggestions and findings into health services planning.(135) Many of these concerns were echoed in an earlier review of the boards and committees by the Ministry of Health and Social Welfare.(136)

In terms of healthcare provision, approximately 70% of the health facilities in Tanzania are public, 14% are private but not for profit, 14% are private, for-profit ventures, and

3% are parastatal.(137) Overall, faith-based organisations own or manage 26% of health facilities (including 40% of all hospitals) and 22% of health staff.(138)

As of 2013, the national government dedicated 7% of its total budget to health, which falls shy of the 15% target that it committed to at the Abuja Declaration in 2001.(139, 140) From 2006/2007–2011/2012, the health budget increased by 176%, the majority of which came from foreign sources.(141) In 2013, approximately one-third of total expenditure on health came from foreign sources.(140) Contributions from foreign sources and the government make up a basket fund from which the health budgets of each district are largely funded.(142) For total health expenditure, including basket funding, 36% came from the government, and 64% was from private sources. Government-sourced funds came largely from public taxation. Among private sources of health expenditure, 52% were out-of-pocket payments, with a modest input from social insurance schemes (4%) and private insurance schemes (2%). The remainder of private source funding (44%) came primarily from foreign donors, contributing to about 25–28% of health expenditure overall.(137, 140, 143) Government spending on healthcare was 18 USD per person in 2013, which falls short of the World Health Organization's estimate of 26.72 USD per person to ensure provision of essential services.(140, 144)

The healthcare system in Tanzania is persistently strained for resources. As a means of tackling this issue, systematic expansion of primary care has taken place since Tanzania first gained independence in the 1960s.(145) The result has been that Tanzania has better health service coverage than most Sub-Saharan African countries, with approximately 90% of the population residing within eight-to-ten kilometres of a health facility, which includes hospitals, health centres, and dispensaries.(145)

History of Community Health Workers In Tanzania
Yet another aspect of increasing accessibility of health care in Tanzania was through the establishment of community health workers, however, this cadre was introduced well before the establishment of the boards or committees described above. Post-independence, Tanzania's social and economic policy was dominated by Ujamaa—a system rooted in socialist principles, which, among other changes, strove to return the population to villages and to restructure villages as the primary centres of economic

production throughout the country. Some new villages were established and others saw their populations increase. Where Ujamaa villages lacked a dispensary, community health workers were established to fill the gap.(146, 147) As such, the first government community health worker scheme in Tanzania began in 1969, with training and management of this cadre by the district management offices. However, the dissolution of Ujamaa in 1986, problems with training and retention, and a lack of coordinated monitoring left little available information on their performance and exclusion of this cadre from the health system.(147)

Tanzania readily embraced primary health care following Alma-Ata in 1978. In 1983 the Government of Tanzania adopted primary health care as a means of improving health services with a view to access and equity. Part of the primary health care strategy was the formal establishment of village health workers, functioning from health posts in every village, who would link communities and health services.(148) In 1992, guidelines for community-based healthcare were established, although limited sustained commitment from the government to these has led to disjointed and inconsistent support for the guidelines and a reliance on donors.(149, 150)

Presently, within the National Health Policy of Tanzania, it is stipulated that each village should have two village health workers, one of whom should focus on maternal and child health.(131) The engagement of communities in mobilising around improving their own health has been further reinforced through Tanzania's series of strategies for growth and reduction of poverty (MKUKUTA), the Primary Health Services Development Plan (MMAM), the Health Sector Strategic Plan III, and the Human Resources for Health Strategic Plan.(151-154) However, there is limited available data on the extent to which these village health workers actually exist, are active, and are supported across the country, either by the government or the non-governmental organisation sector.

As described in more detail in Chapter 5, many of the volunteers within EQUIP previously held or were currently acting in other community health worker-type of roles. Many were volunteers with UNICEF's Child Survival Protection and Development Programme since the mid-1990s, helping to weigh babies for growth monitoring and providing basic health and nutrition education.(155) Other non-governmental organisations have also had a strong presence in supporting other

community-based initiatives for maternal or child health, including the African Medical Research Foundation's maternal and newborn health programming, which aims to provide community-based education around good maternal and newborn care practices, as well as outreach and community mobilisation around malaria prevention.(156)

Maternal and Newborn Health Policy in Tanzania

Maternal and newborn health have been prioritised in Tanzania. Both maternal and neonatal mortality have seen less improvement than expected over the past ten years.(157, 158) According to the 2010 Tanzania Demographic and Health Survey, the maternal mortality ratio in Tanzania was 454 deaths per 100 000 live births, contributing to 17% of all deaths in women aged 15–49 in Tanzania. The neonatal mortality rate in Tanzania shows a similar trend, sitting at 26 per 1000 live births, which is down only slightly from rate of 33 per 1000 live births 15 years prior.(158) Some evidence has suggested that facility births are linked to a decrease in both maternal and neonatal mortality,(159-163) yet in Tanzania, as of 2010, only 52% of births took place in facilities, with younger women being more likely than older women to attend.(158, 164) Among women who reported having at least one major barrier that prevented them from accessing health services for delivery, 24% indicated that a lack of funds was the biggest barrier, 19% said distance to the health facility was the biggest barrier, and 11% indicated that they would not go if they had to go alone.(158)

Several health system and non-health system problems within maternal and newborn health have been identified within the Tanzanian context. Health system problems include:

> "*inadequate implementation of pro-poor policies, weak health infrastructure, limited access to quality health services, inadequate human resources, shortage of skilled health providers, weak referral systems, low utilization of modern family planning services, lack of equipment and supplies, weak health management at all levels, and inadequate coordination between public and private sectors*."(165)(pg.10)

Non-health system problems include:

> "*inadequate community involvement and participation in planning, implementation, monitoring and evaluation of health services, some*

sociocultural beliefs and practices, gender inequality, a weak educational sector, and poor health-seeking behaviour."(165)(pg.11)

In order to address these problems whilst incorporating a universally accepted package of proven maternal and newborn health interventions across a continuum of care, six distinct strategies were highlighted with the overall aim of health systems strengthening:(157)(pp. 8–12)

1. Strengthening leadership, governance, and accountability
2. Improving health financing
3. Developing, deploying, and retaining skilled human resources for health
4. Strengthening the supply chain system
5. Strengthening implementation of the national health management information system
6. Advocacy, community mobilisation, and participation

The emphasis on community mobilisation and participation is conducive with Tanzania's efforts to decentralise the management and provision of health services where possible. As such, highly participatory community-based initiatives such as EQUIP are well in-line with the national policies around maternal and newborn health.

1.2 Problem Statement, Research Questions, and Objectives

Problem Statement

As maternal and newborn mortality in Tanzania remain unacceptably high, there is a need for improvements in both the supply of and the demand for quality maternal and newborn health services. There is evidence, as presented above, that quality improvement holds promise as a type of intervention that may be able to advance better maternal and newborn health outcomes. It has growing applications in Sub-Saharan Africa and increased use at the community level. However, there is a dearth of literature around the study of processes and outcomes of quality improvement, particularly at the community-level, and especially in low-income country settings. As such, new knowledge around community-level quality improvement for maternal and newborn health, including how it is carried out, what it can influence, and what it is influenced by is of relevance, especially in Sub-Saharan Africa. Therefore, the process data around the implementation of community-level quality improvement that this thesis provides may offer critical insights for the development of quality improvement interventions in the future.

Research Questions and Objectives

Originally, this thesis was guided predominantly by questions one, two, and four which sought to understand and document the implementation of community-level quality improvement, uncover the key facilitators of this type of intervention, and determine whether it could influence its primary process outcomes: facility delivery and birth preparedness. However, after being immersed in the literature around community participation, it became clear that community-level quality improvement is, both in theory and practice, closely linked to community participation. Thus, we investigated the extent to which the factors influencing community participation also influenced the EQUIP intervention at the community level. The relationships between participatory processes and community-level quality improvement were explored in research question three. Finally, although not originally intended, with EQUIP's insistence on improving *quality,* we felt it would be of value to engage with the user voice to determine if and how changes in quality were perceived by them. Furthermore, given that community-level quality improvement aimed to improve care-seeking, of which user-perceived quality of care is an important determinant, research question number four could not be fully understood without considering user perspectives of quality. Put simply, it was simply too interesting not to explore the user voice around care, given the opportunities

that we had to do so! Therefore, the research questions and their subsequent objectives, methods, and outputs of this thesis are as follows:

1. **To what extent was the intervention implemented as planned?**
   Objectives: 1.1 Implementation: To analyse implementation and 1.2 Implementation strength: to develop methods to measure implementation strength of community-level quality improvement
   Methods: Implementation of the EQUIP intervention at the community level was documented in-depth in four communities using a mixed-methods process evaluation. A process evaluation framework was populated using data from in-depth interviews with village volunteers, extension workers, health facility staff, EQUIP staff, and village leaders; focus group discussions with volunteers; and analysis of routine process data. Implementation scores were applied to the process evaluation framework and used as a proxy measure of each of the four village's performance using quality improvement
   Outputs: Evaluation of the EQUIP intervention at the community level. (Chapter 3); implementation scores for each of the four villages (Chapter 4, Appendix 2)

2. **What facilitated community-level quality improvement?**
   Objective: 2.1 Facilitators: To explore and synthesise facilitators of community-level quality improvement
   Methods: As above, implementation scores were generated for each of the four villages as proxy measures of performance. Villages were then ranked as high- or low-performing, and factors that were present in high-performing villages—or missing in low-performing villages—were explored to highlight key facilitators of community-level quality improvement
   Outputs: Analysis of key facilitators (which, when absent, are barriers to the intervention) of EQUIP at the community level (Chapter 4)

3. **To what extent do factors influencing community participation-based interventions also influence community-level quality improvement?**
   Objectives: 3.1 Community participation: To understand the extent to which factors influencing community participation also influenced community-level quality improvement; 3.2 Contextual framework: to develop a contextual

framework to explain how these factors influence the implementation and outcomes of community-level quality improvement

Methods: Using qualitative research methods—predominantly in-depth interviews and focus group discussions—the following factors were explored: knowledge and skill transfer to community members; local needs assessment; local leadership; local management; local resource mobilisation; local design and implementation; local monitoring and evaluation; and ownership. These factors were selected owing to their predominance in literature around community participation, many of which are also used as proxies to measure the extent to which community participation occurred. Using constructivist grounded theory, data were analysed thematically through constant comparison.

Outputs: Exploration of factors influencing community participation within the context of community-level quality improvement; contextual framework describing the influence of these factors on community-level quality improvement (Chapter 5)

4. **Can community-level quality improvement influence birth preparedness and place of delivery?**

Objective: 4.1 Birth preparedness and place of delivery: To explore what drives health facility delivery and birth preparedness (two primary process outcomes of EQUIP at the community level)

Methods: Data from the EQUIP continuous household survey were used to provide a quantitative measure of coverage of facility delivery and birth preparedness. In-depth interviews and birth narratives with mothers and their partners were analysed thematically to provide data around why women do or do not deliver in a health facility or make specific birth preparations

Outputs: Examination of what women prepared for birth and why, and where they delivered and why (Chapter 6), discussion of the influence of EQUIP on social norms (Chapter 3)

5. **What can be learned about user-perceived quality of care from quantitative versus qualitative research methods?**

Objective: 5.1 User-perceived quality of care: To use both qualitative and quantitative data to evaluate user-perceived quality of care by uncovering the

insights each data type can provide, and to determine where data triangulate and where data diverge

Methods: The EQUIP continuous survey collected quantitative data around user-perceived quality of care. Qualitative data through in-depth interviews and birth narratives were also used to uncover user-perceived quality of care. Results from the two methods were then compared.

Outputs: Investigation of user-perceived quality of care, as indicated through qualitative or quantitative data (Chapter 7)

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Chapter 2

Methods

This chapter provides additional information about the methodologies used throughout the work presented in this thesis. An overview of methods is also found in results chapters 3, 4, 6, and 7. The methods used to generate the results in Chapter 5 are outlined fully here. This chapter presents more information about the study setting, the process evaluation that guided the study of implementation as a whole, sampling, data collection and analysis, and the management and analysis of qualitative data.

Study Setting

The EQUIP project was present in two districts in southeastern Tanzania: Tandahimba (the intervention district) and Newala (the comparison district). The work presented here represents intervention activities in Tandahimba district only (Figure 2.1).
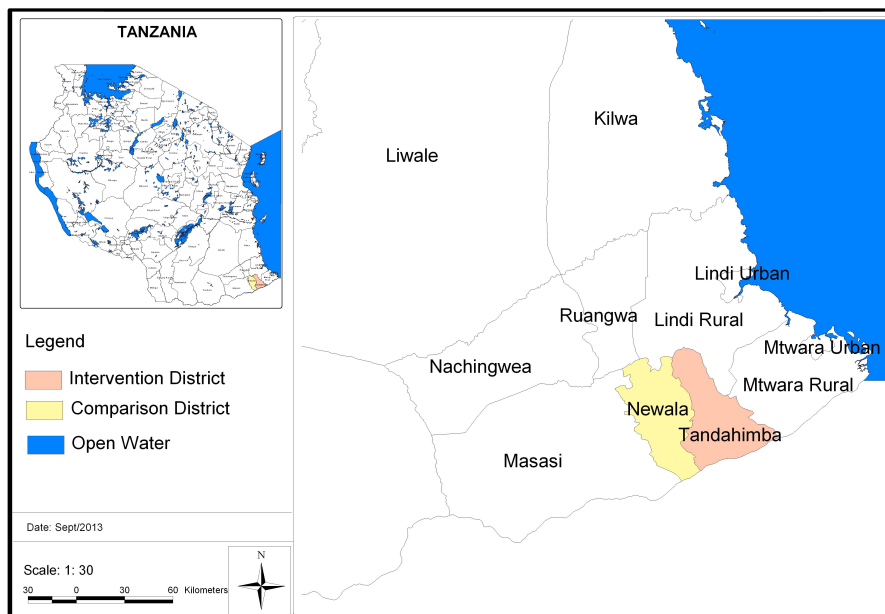
Figure 2.1 The EQUIP intervention (Tandahimba) and comparison (Newala) districts

From the most recent (2012) census, the total population of Tandahimba was 227 514, of whom almost 38% of inhabitants were younger than 15 years. The Makonde are the most prominent ethnic group in Tandahimba.(1) Tandahimba district is divided into three divisions, Mahuta, Litehu, and Namikupa, each with 6–8 wards for a total of 22 wards. Each ward contains 7–8 villages for a total of 157 villages in the district.(2)

In Mtwara region, where Tandahimba is found, in 2004 the literacy rate was only 50%, with approximately 58% of men and only 44% of women able to read and write. The overall primary school enrolment rate among both sexes was 65%.(2) According to the 2012 Tanzania census, among individuals aged 15 and older, 28% had never been married, 54% were currently married, 9% were cohabiting with their partner, and 9% were previously married. The average household size was 3.7 persons. Further, 68% of individuals aged 10 and older were employed, 15% were full-time students, 9% were

engaged in home maintenance, and 7% were unable to work or were unemployed. Over 80% of the population was engaged in agriculture as their primary economic activity—83% of the population tending their own land—with trade and commerce being the next most prominent employment sector, engaging 5% of the population.(3)

As a proxy indicator for higher socioeconomic status, in 2012 only 38% of the households in the region had iron sheets as a roofing material and only 16% of households had a cement floor. Fifty-six percent of households had brick walls, while 42% used poles and mud.(3) Less than 10% of homes had any piped water source coming into the property and 18% of households got their water from a public tap, with the remainder of households getting their water from uncontained or unprotected water sources.(3) Much of the region was without electricity, with only 6% of households on the grid. Most households had a pit latrine, although 3% of households were without any toilet facilities at all. Finally, 8% of households were part of a social insurance scheme.(3)

In Mtwara region, maternal and newborn health indicators are among the poorest in the country. In 2010 Mtwara region had a maternal mortality rate of 712 deaths per 100 000 live births and a neonatal mortality rate of 31 deaths per 1000 live births, compared to a national average of 454 deaths per 100 000 live births and 26 deaths per 1000 live births respectively.(4, 5) Mtwara region is historically disadvantaged, receiving little government support until offshore oil was commercialised in 2006.(6, 7) Previously, the largest government initiative here was a disastrous groundnut scheme, which was abandoned in 1951.(8) At present, Mtwara region is in a period of economic growth, as evidenced through increasing property and land value, the opening of a university in 2009, and infrastructure developments, especially in and around Mtwara town. In 2013, local residents protested against the building of a pipeline that would bring natural gas up to Dar es Salaam, resulting in civil unrest and now an ongoing military presence and persistent tension in the region.(9)

Process Evaluation Design

Given the research questions around implementation, intervention facilitators, community participation, and process outcomes, a study design that enabled the explicit study of implementation and its outcomes in-depth was required. Here, process outcomes refer to the interim outcomes that directly result from the activities of an intervention. For example, direct process outcomes such as number of people trained or whether there was an increase in capacity to use quality improvement. Higher-level process outcomes that more explicitly link to the overall aims of the intervention include measures like the percentage of women in each village giving birth in health facilities. As such, a process evaluation was used to organise data collection (see Chapter 4 for more detail). This process evaluation was conceptualised by the author and served as the study design for the primary data collection for this thesis. The process evaluation framework was adapted from Linnan and Steckler and Saunders et al.(10, 11) using a framework with seven major components, described briefly below:

1. Fidelity: the extent to which community-level quality improvement was carried out as planned
2. Completeness: the number and type of activities carried out at the community-level
3. Exposure: the extent to which intervention participants (village volunteers and extension workers) and targets (recently delivered women and their partners) actively engaged with and were receptive to the intervention, if at all
4. Reach: the proportion of intended targets who received the intervention
5. Satisfaction: implementer (village volunteers and extension workers) and target (recently delivered women and their partners) satisfaction with the intervention
6. Recruitment: procedures used to attract and sustain volunteers and extension workers
7. Context: aspects of the environment that may have influenced the implementation of the intervention or study outcomes

In *Data Collection and Analysis* below, the process evaluation is framed around data collection tools, highlighting links to research objectives, analysis, and outputs for each. Please see Appendix 3 for the process evaluation as organised by the seven components above, including the sub-research questions asked for each. Indicators and data sources are shown. Primary qualitative data were collected throughout. Secondary quantitative process data and some data from the continuous household survey were also compiled.

Sampling for the Process Evaluation

Volunteers operated at the village level, and four villages were purposively selected for in-depth study. Inclusion criteria for the villages were as follows:

1. The volunteers had to have attended at least two learning sessions and had to have attempted at least two change ideas in their villages by November 2013. These criteria were set in order to capture villages that were not just starting out in quality improvement, but had an opportunity to become somewhat familiar with the intervention. Lessons learned within this first wave of implementation were brought into other villages as the intervention was scaled-up. To ensure that these experiences were captured, villages that first received the intervention in the first wave of implementation were eligible for selection.

2. Villages had to have been sampled at least twice in the EQUIP continuous survey, leaving eight possible villages to select from.

From these eight villages, four were then sampled purposively to represent diverse contexts. A summary of the contextual features known a priori that influenced sampling included: level of nearest health facility (hospital, health centre, or dispensary); distance to the nearest health facility; volunteer characteristics (age, education level, previous history of community participation); primary economic activities, predominant ethnic groups in the village; and presence of schools or other indicators of wealth (e.g. electricity supply).

Village A: Very near to a hospital, also a dispensary is within a few kilometres from the village. Located along a main road. EQUIP volunteers were both older than in other villages with longstanding histories of community participation. No INSIST intervention. Primary economic activity is agriculture, especially farming of groundnuts and cashews. Village residents are predominantly from the Makonde ethnic group, with some refugees from Mozambique who are generally poorer than others in the village. Village has a primary school only.

Village B: Approximately five kilometres from a dispensary and 12 kilometres from the main road. One EQUIP volunteer had a longstanding history of community participation, the other—a younger male—did not. INSIST intervention active. Primary economic activities are agriculture, especially farming of groundnuts and cashews;

males here also engage in brick-making. Village is predominantly Makonde. Village has a primary school only.

Village C: A dispensary (which was in the midst of being upgraded to a health centre) is located within the village. The village is almost 25 kilometres from the main road. It is very difficult to get to the main road during the rainy season. Of their two volunteers one had a longstanding history of community participation and one—a younger male—did not. INSIST intervention active. Primary economic activities are agriculture, especially farming of groundnuts and cashews as well as other crops like rice and sugarcane. Village is predominantly Makonde. Village has a primary school only.

Village D: A health centre is located within the village. The village is located along a main road. Of the volunteers, one had a longstanding history of community participation and the other—a younger female—did not. INSIST intervention active. Primary economic activities are agriculture, especially farming of groundnuts and cashews, as well as small business as the village is located along a trading route. Village is predominantly Makonde. Village is relatively wealthy with both a primary and a secondary school. Part of the village also has a regular supply of electricity.

Data Collection and Analysis
In-depth Interviews with EQUIP Volunteers
Description: As EQUIP volunteers were key implementers of the intervention, their perceptions and activities within EQUIP were essential to capture. In-depth interviews were felt to be the most appropriate means of uncovering their experiences. Each village had two volunteers. Semi-structured in-depth interviews were carried out with eight volunteers—two from each of the four sampled villages in November 2012 and November 2013. A total of 15 interviews were conducted (one volunteer was not available in 2013).

Links to process evaluation components: Fidelity, completeness, exposure, satisfaction, and recruitment

Links to research objectives: Implementation (1.1), implementation strength (1.2), facilitators (2.1), community participation (3.1), and conceptual framework (3.2)

Analysis: See chapters 3 and 4 and section on analysis of chapter 5 below

Output: See chapters 3 (How People-Centred Health Systems Can Reach the Grassroots), 4 (Facilitators and Barriers of Community-Level Quality Improvement in Tanzania), and 5 (Community Participation within Community-Level Quality Improvement)

Focus Group Discussions with EQUIP Volunteers

Description: In order to further explore emerging themes from in-depth interviews with volunteers from sampled villages and to explore divergent cases, three focus group discussions with volunteers were carried out in May 2013 and two in October 2013.

Links to process evaluation components: Fidelity, completeness, exposure, satisfaction, and recruitment

Links to research objectives: Implementation (1.1), implementation strength (1.2), facilitators (2.1), community participation (3.1), and conceptual framework (3.2)

Analysis: See chapters 3 and 4 and section on analysis of Chapter 5 below

Output: See chapters 3 (How People-Centred Health Systems Can Reach the Grassroots), 4 (Facilitators and Barriers of Community-Level Quality Improvement in Tanzania), and 5 (Community Participation within Community-Level Quality Improvement)

In-depth Interviews with Extension Workers

Description: Like village volunteers, extension workers were key implementers of EQUIP whose perspectives were best gained through in-depth interviews. The two extension workers—each overseeing the work in two of the sampled villages—both gave semi-structured in-depth interviews in November 2012 and again in November 2013.

Links to process evaluation components: Fidelity, completeness, exposure, satisfaction, and recruitment

Links to research objectives: Implementation (1.1), implementation strength (1.2), facilitators (2.1), community participation (3.1), and conceptual framework (3.2)

Analysis: See chapters 3 and 4 and section on analysis of Chapter 5 below

Output: See chapters 3 (How People-Centred Health Systems Can Reach the Grassroots), 4 (Facilitators and Barriers of Community-Level Quality Improvement in Tanzania), and 5 (Community Participation within Community-Level Quality Improvement)

In-depth Interviews with Health Facility Staff

Description: Owing to their interaction with volunteers and extension workers, it was important to also gain insights from health facility staff, and in-depth interviews were the most appropriate means of doing so. Semi-structured in-depth interviews were carried out in May 2013 and later in October 2013. One health facility representative who was engaged in the quality improvement work was selected each time. The same staff members were interviewed in both data collection periods save at one health facility in which the staff member changed.

Links to process evaluation components: Fidelity and context

Links to research objectives: Implementation (1.1), implementation strength (1.2), facilitators (2.1), community participation (3.1), and conceptual framework (3.2)

Analysis: See chapters 3 and 4

Output: See chapters 3 (How People-Centred Health Systems Can Reach the Grassroots) and 4 (Facilitators and Barriers of Community-Level Quality Improvement in Tanzania)

In-depth Interviews with Village Executive Officers

Description: Village leaders are often the gatekeepers of communities. Understanding their views of EQUIP and their relationship with the volunteers and extension workers was essential. Again, in-depth interviews were felt to be the means of addressing these views. Village executive officers in each of the four sampled villages gave semi-structured in-depth interviews in May of 2013.

Links to process evaluation components: Fidelity, completeness, exposure, recruitment, and context

Links to research objectives: Implementation (1.1), implementation strength (1.2), facilitators (2.1), community participation (3.1), and conceptual framework (3.2)

Analysis: See chapters 3 and 4

Output: See chapters 3 (How People-Centred Health Systems Can Reach the Grassroots) and 4 (Facilitators and Barriers of Community-Level Quality Improvement in Tanzania)

Social and Resource Mapping with Village Executive Officers

Description: To better understand contextual factors that might be at play in each village, village executive officers in each of the four sampled villages drew and described social and resource maps of their respective communities in May of 2013.

Links to process evaluation component: Context

Links to research objectives: Implementation (1.1), implementation strength (1.2), and facilitators (2.1)

Analysis: Maps were uploaded into NVivo and parts of each were coded and analysed thematically for potentially important contextual factors

Output: Chapter 4 (Facilitators and Barriers of Community-Level Quality Improvement in Tanzania)

In-depth Interviews with Mothers

Description: As the primary targets of the volunteer's change ideas, understanding women's receptiveness to volunteers, the effect of the EQUIP intervention on them, if at all, and the motivation for behaviours related to maternal and newborn health was initially felt to be best captured through in-depth interviews. Semi-structured in-depth interviews with 12 mothers—three from each of the sampled villages—were carried out in May of 2013. We aimed to include at least one mother from each village who gave birth at home.

Links to process evaluation components: Fidelity, exposure, reach, and satisfaction

Links to research objectives: Implementation (1.1), implementation strength (1.2), facilitators (2.1), community participation (3.1), conceptual framework (3.2), birth preparedness and health facility delivery (4.1), and user-perceived quality of care (5.1)

Analysis: See chapters 3, 6, and 7 and section on analysis of Chapter 5 below

Output: See chapters 3 (How People-Centred Health Systems Can Reach the Grassroots) and 4 (Facilitators and Barriers of Community-Level Quality Improvement in Tanzania)

Birth Narratives with Mothers

Description: To place more emphasis on women naturally discussing what was most relevant to them in their pregnancies, childbirth, and post-partum, we carried out birth narratives, which were more flexible than in-depth interviews. 12 birth narratives in July 2013 and 11 narratives in October 2013 were carried out.

Links to process evaluation components: Fidelity, exposure, reach, and satisfaction

Links to research objectives: Implementation (1.1), implementation strength (1.2), facilitators (2.1), community participation (3.1), conceptual framework (3.2), birth preparedness and health facility delivery (4.1), and user-perceived quality of care (5.1)

Analysis: See chapters 3, 6, and 7 and section on analysis of Chapter 5 below

Output: See chapters 3 (How People-Centred Health Systems Can Reach the Grassroots), 5 (Community Participation within Community-Level Quality Improvement), 6 (Birth Preparedness and Place of Birth in Tandahimba District, Tanzania), and 7 (Using Mixed Methods to Evaluate Perceived Quality of Care in Southern Tanzania)

Birth Narratives with Fathers

Description: As above, seven birth narratives in July 2013 and six narratives in October 2013 were carried out.

Links to process evaluation components: Fidelity, exposure, reach, and satisfaction

Links to research objectives: 1–5

Analysis: See chapters 3, 6, and 7 and section on analysis of Chapter 5 below

Output: See chapters 3 (How People-Centred Health Systems Can Reach the Grassroots), 5 (Community Participation within Community-Level Quality Improvement), 6 (Birth Preparedness and Place of Birth in Tandahimba District, Tanzania), and 7 (Using Mixed Methods to Evaluate Perceived Quality of Care in Southern Tanzania)

Key Informant Interviews with EQUIP Staff

Description: Three EQUIP staff oversaw the community-level activities within EQUIP at different time periods. To gain insights about the operational aspects of the EQUIP intervention, each staff member gave a semi-structured key informant interview about the implementation of the intervention.

Links to process evaluation components: Fidelity, completeness, and recruitment

Links to research objectives: Implementation (1.1), implementation strength (1.2), facilitators (2.1), community participation (3.1), and conceptual framework (3.2)

Analysis: See chapters 3 and 4 and section on analysis of Chapter 5 below

Output: See chapters 3 (How People-Centred Health Systems Can Reach the Grassroots), 4 (Facilitators and Barriers of Community-Level Quality Improvement in Tanzania), and 5 (Community Participation within Community-Level Quality Improvement)

Key Informant Interviews with District Community-Level Quality Improvement Mentor

Description: The district community-level quality improvement mentor—a community development officer employed by the government—oversaw the work of extension workers and participated in all learning sessions and many monthly cluster meetings, sometimes providing direct support to volunteers. As such, to gain the perspective of someone engaged in both the operational aspects of the intervention as well as implementation, he was interviewed in November of 2012 and again in 2013.

Links to process evaluation components: Fidelity, completeness, and recruitment

Links to research objectives: Implementation (1.1), implementation strength (1.2), facilitators (2.1), community participation (3.1), and conceptual framework (3.2)

Analysis: See chapters 3 and 4 and section on analysis of Chapter 5 below

Output: See chapters 3 (How People-Centred Health Systems Can Reach the Grassroots), 4 (Facilitators and Barriers of Community-Level Quality Improvement in Tanzania), and 5 (Community Participation within Community-Level Quality Improvement)

Key Informant Interviews with Non-Governmental and Governmental Organisation Staff

Description: Two non-governmental organisation initiatives and one government initiative around maternal and child health and/or community development were indicated as active by village executive officers in the four sampled villages. In order to gain information about other interventions that may or may not be have affected both the implementation of EQUIP as well as its outcomes, representatives from these three initiatives gave semi-structured key informant interviews.

Links to process evaluation component: Context

Links to research objectives: Implementation (1.1), implementation strength (1.2), and facilitators (2.1)

Analysis: Interviews were coded line-by-line and analysed thematically in NVivo 10

Output: Chapter 4 (Facilitators and Barriers of Community-Level Quality Improvement in Tanzania)

EQUIP Continuous Household Survey

Description: This was a continuous, cross-sectional household survey that took place between November 2011 and April 2014. Data presented in this thesis are from a time period of November 2011 until November 2013, in which 11 473 households and 6131 women aged 13–49 consented to participate in the survey.(12) Survey data on birth preparedness and place of delivery for women who had a recent birth, as well as perceived quality of care, were analysed.

Links to process evaluation component: Context

Links to research objectives: Birth preparedness and health facility delivery (4.1) and user-perceived quality of care (5.1)

Analysis: The EQUIP continuous survey was already in place as part of the EQUIP intervention and as such, all data derived from this method were analysed as secondary data. See chapters 6 and 7

Output: See chapters 6 (Birth Preparedness and Place of Birth in Tandahimba District, Tanzania) and 7 (Using Mixed Methods to Evaluate Perceived Quality of Care in Southern Tanzania)

Observation

Description: To get a better understanding of EQUIP activities as they were in situ, one learning session (November 2012) and five monthly cluster meetings (one in 2012, four in 2013), and two meetings for extension workers only were observed.

Links to process evaluation component: Fidelity

Links to research objectives: Implementation (1.1)

Analysis: Field notes from observation were analysed thematically

Output: See chapters 3 (How People-Centred Health Systems Can Reach the Grassroots) and 4 (Facilitators and Barriers of Community-Level Quality Improvement in Tanzania)

Data Collection Period

	2011	2012				2013				2014	
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
EQUIP implementation period											
Continuous survey											
Process evaluation data collected											
"Participant checking" and results dissemination											
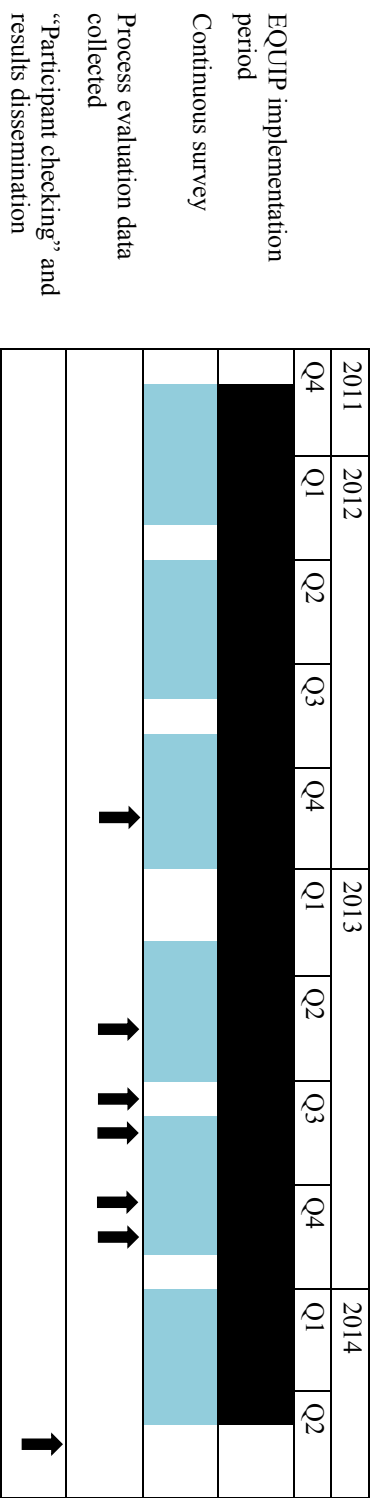
Figure 2.2 Timeline of data collection against continuous survey rounds and overall EQUIP implementation

Data Analysis for Chapter 5: Community Participation within Community-Level Quality Improvement

As Chapter 5 is a working paper of results, the analysis of data for that chapter is presented here. The methods for data analysis for results chapters 3, 4, 6, and 7 are embedded within their respective chapters.

Chapter 5 explores community participation within the context of community-level quality improvement. The predominant data source for this work was in-depth interviews and focus group discussions with village volunteers. However, in-depth interviews with village executive officers (village leaders), extension workers, local health facility staff, and EQUIP staff were also used to provide further detail about volunteer engagement with their communities and the intervention, which was reflected in the contextual framework developed.

Field notes were written and in-depth reviews for each point of data collection were conducted. Audio data were transcribed into Swahili and then translated into English. Familiarisation with field notes and translated transcripts was undertaken.[13] Data were read and re-read and some initial codes were generated based on these.[13, 14] As with all of the qualitative data in this thesis, where possible, data were analysed through constant comparison, with each point of data collection aiming to build upon what had previously been learned.[15] Constructivist grounded theory was used to develop a conceptual framework theorising how the factors influencing community participation influence the implementation and outcomes of community-level quality improvement.[16, 17]

Factors influencing community participation referred to here were selected not only owing to their prominence in literature around community participation, but also due to their applicability to quality improvement, given its emphasis on bottom-up problem solving and robust engagement of stakeholders. These included: knowledge and skill transfer to community members;[18, 19] local leadership;[19-22] local management;[20-22] local needs assessment;[20, 21] local design and implementation;[23, 24] local monitoring and evaluation;[21, 22] local resource mobilisation;[20, 22] and local ownership.[18, 19] Data were coded line-by-line, and a

hierarchical coding scheme was generated, in which these factors influencing community participation were among the higher-level categories.(14)

Categories and sub-categories were interpreted to yield a sense of the themes behind each of these factors in particular. Although these factors were explored intentionally, the emergence of other codes, and subsequently categories, related to community participation were also explored (25)—among these are some ethical concerns arising from the community participation work. Viewed together, emergent themes were used to generate a conceptual framework for the influence of these factors on the implementation of community-level quality improvement. Representative quotations that best expressed each theme are highlighted in Chapter 5.

Qualitative Data Collection, Quality Control, and Analysis
As much of the primary data collected for this thesis were qualitative there are some additional considerations about the methodologies that are worth noting here, as they are not elaborated on within the methods of the results chapters in which they are reported.

Two research assistants collected all qualitative data with the exception of key informant interviews, which were carried out by me. Both of the research assistants were women in their late-twenties who had completed degrees in the social sciences and had experience collecting qualitative data in Mtwara region for a number of years, including working on other maternal health projects. As such, they were familiar with the local context and much of the local vernacular around pregnancy and childbirth.

Being reflexive of my positionality as a researcher,(26-29) there are a number of characteristics that I have examined throughout this work. As a well-educated white woman in a country in Eastern Africa with a recent history of colonialism, my skin colour alone undoubtedly carried with it significant privilege and expectations. In my experience, an advantage of this position to the research was that participants seemed extremely willing to participate. It is probable that some may have held the expectation of money in exchange for speaking with a "mzungu" (foreigner), which may have influenced their participation. We did provide a bar of soap to show our thanks to each participant, but not to unfairly incentivise their participation. Throughout, participants were thanked for sharing their knowledge and experience.

My education and relative wealth compared to all of the research participants, as well as my research assistants, also placed me in a position of power. However, my lack of lived experience as a wife and a mother (I am unmarried and childless) carried with it a different influence on power, in this case, minimising my power, as I lacked a certain degree of social legitimacy. There were several steps taken in order equalise power between our participants and us as researchers. We made efforts to accommodate participants, particularly recently delivered women and their husbands. For example, interviews took place at the homes of these participants or at a location where they felt comfortable and safe. Interview or focus group discussions were held at times that were most convenient for them, even if it meant excruciatingly early start times! Additionally, cognisant of the connotations associated when arriving in a village in a large 4X4 vehicle with "Ifakara Health Institute" clearly on the side, we often travelled to and between villages by "boda boda" (motorcycle). As such, my research assistants and I were less conspicuous and slightly more relatable. Each day we arrived by motorcycle, bemused comments and surprise from participants followed.

Finally, my formal training is in Immunology and Infection and Public Health. As such, I do come from a very biomedical background, dominated by a positivist lens. Shifting to predominantly qualitative research, I have had to challenge my own ways of seeing and knowing and have become increasingly more aware of the co-construction of knowledge and the importance of the research environment and the dynamic between the participant and the researcher in producing valuable data. Observing as many activities as possible over an extended period as well as engaging with participants (namely volunteers, extension workers, and EQUIP staff) over time increased their familiarity with me. I also found that smiling, laughing, and appealing to humour were very important in establishing myself as slightly less than an unknown outsider.

I was present for all interviews, with the exception of birth narratives with mothers and fathers or most in-depth interviews with mothers. After three in-depth interviews, it was quickly realised that the presence of a foreign woman in households was not conducive to a positive interview environment for many mothers, likely owing to some of features of my position that I indicated above. As such, after discussion with my research assistants, it was decided that it was best I not be present for further in-depth interviews and birth narratives. Participants then tended to be more open and forthcoming. To the

greatest extent possible, I tried to make note of how my presence was affecting other research participants.

Research assistants were debriefed immediately, with special note of participant attitudes, perceived comfort level, questions that participants were resistant to answer, and so forth. These debriefs as well as extensive field notes that were collected by the two primary research assistants and myself were collated and also regarded as data. Both research assistants were as reflexive as possible. As they are both mothers themselves, I asked them to reflect on how they were influenced or perhaps influencing participants during data collection, especially as they would occasionally refer to their own pregnancies or experiences of childbirth during data collection, often to put participants at ease. I asked that they attempt to remain as objective as possible, and during debriefing, we always discussed if there were alternative interpretations to the responses that they had been given, beyond what their first assumptions had been during the interviews, and how, because of these assumptions, their questioning or probing style may have affected participants and their responses.

Although sampling of villages was purposive, there was limited sampling of implementation respondents within the villages, as all implementers (volunteers and extension workers), local health facility staff, and EQUIP staff were interviewed. Sampling of mothers and fathers (recipients of implementation) was more purposive, being selected from women who had recently given birth (typically within three months) within sampled villages—as indicated in volunteer records—inclusive of at least one woman who had a home birth. Women who were particularly old or young, who had a surgical intervention such as caesarean section, or who were primiparous or had five or more children were selectively included to ensure a broad range of participant characteristics. Likewise, for fathers, we aimed to speak with the partners of women already selected. In some cases male partners were not available, therefore, we used similar selection criteria—age, number of children, whether their partner had a home birth, and whether their partner had a surgical intervention—to determine whom we would speak with.

Data collection tools were all translated from English-to-Swahili and then back-translated (by a different person) from Swahili-to-English to ensure that the content of the questions was retained. With the exception of key informant interviews, all other

data collection instruments were pilot tested in a fifth village. Amendments based on piloting were reflected across data collection tools. For all audio data, transcripts were generated and translated from Swahili-to-English, with special efforts made to ensure data quality was high. The two research assistants who carried out all data collection are fluent in both English and Swahili. As such, they reviewed transcripts against the original audio and corrected the files until they agreed with the translation. Most transcription and all translation was done by an additional three research assistants to ensure that turnover of scripts was quick enough that any interesting findings could be reflected in instruments for further exploration as data collection continued.

When clearly divergent cases or very strongly emerging themes became apparent, subsequent data collection was adjusted to account for these. For example, when it was first learned that communities were incentivising volunteers internally through a village-based allowance (see chapters 3 and 4), questions around village-provided incentives were then asked in subsequent sets of data collection from village volunteers and leaders. As such, ongoing analysis of data was used in order to refine data collection tools to explore data to the greatest extent possible. Focus group discussions were used to confirm convergent or divergent data, and to validate findings from the volunteers in the four sampled villages.

Major findings linked to the description of the intervention, the outcomes of the intervention, and the facilitators of the intervention were discussed with volunteers, extension workers, and some participating village executive officers in May of 2014. Although not a formal process of participant checking, there seemed to be enthusiastic consensus that the interpretation of the results I shared was correct.

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RESEARCH PAPER COVER SHEET

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SECTION A – Student Details

Student	Tara Tancred
Principal Supervisor	Tanya Marchant
Thesis Title	Implementation of community-level quality improvement in southeastern Tanzania: a mixed methods process evaluation of what worked, what didn't, and why?

<u>If the Research Paper has previously been published please complete Section B, if not please move to Section C</u>

SECTION B – Paper already published (Chapter 3)

Where was the work published?	Health Policy and Planning		
When was the work published?	October 2014		
If the work was published prior to registration for your research degree, give a brief rationale for its inclusion	N/A		
Have you retained the copyright for the work?*	Yes	Was the work subject to academic peer review?	Yes
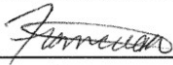
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SECTION C – Prepared for publication, but not yet published

Where is the work intended to be published?	
Please list the paper's authors in the intended authorship order:	
Stage of publication	

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary)	I conceptualised, carried out, analysed, and wrote the Tanzanian findings presented. I wrote the entire first draft of the paper.

Student Signature: _____   Date: 31/07/15

Supervisor Signature: _____   Date: 31/7/15

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Chapter 3

Research Paper 1: How People-Centred Health Systems Can Reach the Grassroots: Experiences Implementing Community-Level Quality Improvement in Rural Tanzania and Uganda

This chapter provides an overview of EQUIP at the community level, describing the intervention's activities and introducing some key findings around implementation. These findings relate to the capacity of village volunteers to learn and undertake quality improvement work, the collaboration between health facilities and communities through EQUIP, and the ability of the intervention to contribute to positively changing social norms around pregnancy and childbirth. Of note is that the paper that follows also presents findings from the Ugandan context, which will not be described or discussed elsewhere in this thesis. This chapter was published in Health Policy and Planning on October 1st, 2014:

http://heapol.oxfordjournals.org/content/early/2014/09/21/heapol.czu070.full.

Title

How people-centred health systems can reach the grassroots: experiences implementing community-level quality improvement in rural Tanzania and Uganda

Authors

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(The EQUIP Study Team: U Baker, H Balidawa, R Byaruhanga, J Jaribu, D Kaijo, J Kalungi, A Majura, A Mussa, P Okong, Y Sedekia, and G Tomson)

Abstract

Background: Quality improvement methods engage stakeholders in identifying problems, creating strategies called change ideas to address those problems, testing those change ideas, and scaling them up where successful. These methods have rarely been used at the community level in low-income country settings. Here we share experiences from rural Tanzania and Uganda, where quality improvement was applied as part of the EQUIP intervention with the aim of improving maternal and newborn health. Village volunteers were taught how to generate change ideas to improve health-seeking behaviours and home-based maternal and newborn care practices. Interaction was encouraged between communities and health staff.

Aim: To describe experiences implementing EQUIP's quality improvement approach at the community level.

Methods: A mixed methods process evaluation of community-level quality improvement was conducted in Tanzania and a feasibility study in Uganda. We outlined how village volunteers were trained in and applied quality improvement techniques and examined the interaction between village volunteers and health facilities, and in Tanzania, the interaction with the wider community also.

Results: Village volunteers had the capacity to learn and apply quality improvement techniques to address local maternal and neonatal health problems. Data collection and presentation was a persistent challenge for village volunteers, overcome through intensive continuous mentoring and coaching. Village volunteers complemented health facility staff, particularly to reinforce behaviour change on health facility delivery and

birth preparedness. There was some evidence of changing social norms around maternal and newborn health, which EQUIP helped to reinforce.

Conclusions: Community-level quality improvement is a participatory research approach that engaged volunteers in Tanzania and Uganda, putting them in a central position within local health systems to increase health-seeking behaviours and improve preventative maternal and newborn health practices.

Introduction

Improvements in maternal and neonatal health have been prioritised internationally through the Millennium Development Goals 4 and 5.(1) With over 98% of maternal and neonatal deaths being concentrated in low- and middle-income countries, there is an obvious need to tailor efforts to these settings.(2, 3) Although gains have been made, the pace of improvement in maternal and neonatal mortality rates has been slow, with few interventions to-date being successful in markedly and sustainably reducing maternal and neonatal mortality at scale.(4, 5) Uganda and Tanzania are two countries where maternal and newborn deaths have been slow to decline.(6, 7)

With the aim of improving both the supply of and the demand for quality maternal and newborn health services in Tanzania and Uganda,(8) the "Expanded Quality Management Using Information Power to Improve Maternal and Newborn Health" (EQUIP) intervention has implemented quality improvement (QI) processes at the community, health facility, and district levels (Figure 1).(8)

Quality Improvement Theory

QI is a management philosophy that challenges vertical management approaches through the engagement of multiple stakeholders in the bottom-up identification of problems and the design of context-appropriate solutions.(9) To address local problems in maternal and newborn health, EQUIP applied QI using an approach pioneered by the Institute for Healthcare Improvement.(10) The cornerstone is the plan-do-study-act or PDSA cycle, which is a structured approach for planning, implementing, and evaluating a strategy to address a problem. The approach is designed around answering three key questions: What are we trying to accomplish? What changes can we make that will result in an improvement? How will we know that change is an improvement?(10) The PDSA cycles are then used to plan and test strategies (called "change ideas") to ensure that improvements are made.

Community-Level Quality Improvement

Typically, QI has been used at the facility or administrative level, and rarely at the community level, especially within low- and middle-income country settings.(11) Three examples of where community members have been engaged in QI are from the Democratic Republic of Congo, Vietnam, and Ethiopia. In the first two, the primary aim

was to improve health services.(12, 13) In Ethiopia, QI was used to increase health-seeking behaviours.(14) Community-level QI within EQUIP also aims to increase health-seeking behaviours and to improve preventative maternal and newborn care practices. Overall, an innovative aspect of EQUIP is that community, health facility, and district-level QI occurred simultaneously, and community QI was done exclusively *by* community members *for* community members.

EQUIP's Community-Level Quality Improvement in Tanzania and Uganda
The use of QI within EQUIP, with its emphasis on change ideas that are continually generated, evaluated, and modified by community members, can be considered as a participatory research approach. Participatory research here is defined as research that focuses on locally defined priorities and local perspectives and that involves community members as research participants.(15)

The EQUIP intervention is described in detail elsewhere.(16) In both Tanzania and Uganda, the intervention was implemented in one district (Tandahimba in Tanzania, Mayuge in Uganda) using a neighbouring district as a comparator for effect evaluation. The intervention pilot began in September of 2011 and reached district-level scale throughout all communities by August 2012 in Tanzania and January 2013 in Uganda.

Here we describe the experience implementing EQUIP's QI approach at the community level for increased demand for maternal and newborn health services and improved community-level maternal and newborn care practices.

Methods

Figure 3.1 highlights the conceptual framework of EQUIP, showing how the three levels of the intervention can interact with one another to increase both the supply of and demand for quality maternal and newborn health services. The methods described below explored the implementation of the EQUIP intervention, which is ongoing until April 2014. An overall evaluation of EQUIP's impact on maternal and newborn health indicators will follow.
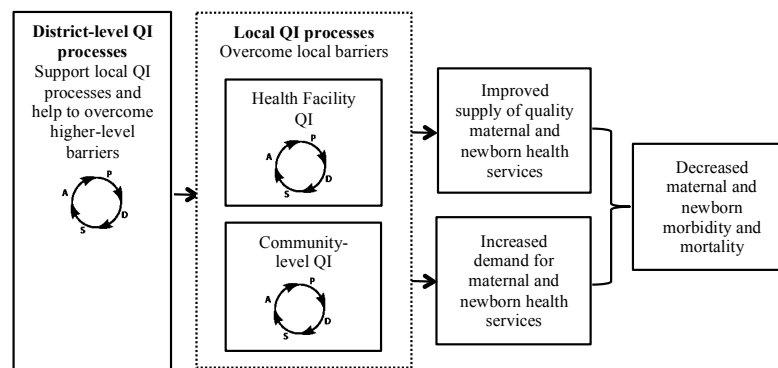
Figure 3.1 EQUIP's conceptual framework for quality improvement at the district, health facility, and community levels to reduce maternal and newborn morbidity and mortality

Tanzania

Qualitative data were collected from November 2012–November 2013 as part of an in-depth mixed methods process evaluation of the community-level QI activities. The objective of this process evaluation was to uncover the main barriers and facilitators of community-level QI.

Study setting

The total population of the intervention district, Tandahimba, is 227 514 (17), with the most prominent ethnic group being the Makonde.(18) Agriculture employs over 94% of the population in Tandahimba.(19) The maternal mortality ratio from 2004–2007 was 712 [95% CI 652–777] per 100 000 live births in six districts of the southern zone including Tandahimba (20) and the neonatal mortality rate estimate was 31 deaths in the first 28 days of life per 1000 live births in 2010,(21) both of which are higher than Tanzania's national estimates

Within EQUIP, each of the 157 villages in Tandahimba had two village volunteers for a total of 314 village volunteers. Volunteers were eligible for selection by village leaders and/or community members if they were literate, permanent residents of the village. Volunteers from 15–18 villages formed groups that met monthly; there were 10 volunteer groups in total, and a government education extension worker with a background in teaching acted as a QI mentor for each group. In addition to monthly meetings, every three months volunteers from three-to-four volunteer groups came together to participate in a meeting called a learning session. Three learning sessions were held every quarter throughout Tandahimba district. Here volunteers reviewed progress and received information about new topics related to maternal and newborn health. At learning sessions, volunteers had the opportunity to present their own data and exchange with one another. A community district mentor, also a government community development officer, facilitated these learning sessions together with volunteer group QI mentors and EQUIP staff. At learning sessions, change ideas were developed, each with work plans outlining exactly how those change ideas would be tested. The interval of three months between learning sessions was referred to as an "action period" in which change ideas were implemented on a small scale and data were collected to evaluate them. These change ideas were then adapted and tested again or scaled up and monitored if successful. Volunteers used PDSA cycles to guide them through the creation, testing, and scaling up of change ideas. Table 3.1 shows the implementers of the EQUIP intervention and their activities.

Data collection and management
Four villages in Tandahimba district were purposively sampled for this study on the basis of their diversity. These villages differed regarding proximity to health facilities, level of referral health facility (dispensary, health centre, or hospital), primary economic activities, predominant religion, and age of their volunteers. Volunteers in all four villages were active for at least six months prior to the onset of the process evaluation.

Table 3.2 indicates the qualitative data collection methods used. In addition, learning sessions and volunteer group monthly meetings were observed. All interviews, birth narratives, and focus group discussions were piloted, revised, and implemented in Swahili by two trained interviewers. Audio data were then transcribed and translated into English. TT and both interviewers kept extensive field notes, which were debriefed

daily. For data quality control, the translated transcripts were checked against the original audio and verified by a fluent English-Swahili speaker.

Table 3.1 Overview of EQUIP implementers in both Tanzania and Uganda, their responsibilities, time required for responsibilities, and incentives or reimbursement provided

EQUIP intervention implementer	Total number	Activities	Time required for responsibilities	Allowances and reimbursement provided by EQUIP
Tanzania				
Village Volunteers	314 (two per village in each of 157 villages)	Learning sessions: one volunteer per village (alternating each learning session) attends to problem solve and develop change ideas with support from extension workers, community-level district mentor, and EQUIP staff	One day every three months	Sitting allowance (25 000 Tanzanian shillings, approximately 15.90 USD) per volunteer per learning session attended
		Action period: test and implement change ideas at community-level; collect routine monitoring data	One day per week	No allowances provided by EQUIP
		Mentoring and coaching: participation in monthly volunteer meetings	Two-to-four hours per month	Transportation allowance (5000 Tanzanian shillings, approximately 3.20 USD) per volunteer per meeting attended
Volunteer Group QI Mentors (Extension Workers)	10 (one to supervise volunteers from 15–18 villages)	Learning sessions: provide support to volunteers during learning sessions	Two days every three months (one day prior to learning session for preparation)	Sitting allowance (25 000 Tanzanian shillings, approximately 15.90 USD) per extension worker per learning session attended
		Mentoring and coaching: facilitate monthly volunteer meeting	One day per month	Sitting allowance (10 000 Tanzanian shillings, approximately 6.40 USD) per meeting per extension worker per meeting attended

Role	Number	Activities	Time	Allowances
		Mentoring and coaching: verify volunteer activities and data from each village. Visit volunteers from five-to-six villages each month. Each volunteer is followed-up by their extension worker in their respective villages once per action period	Two-to-three days per month	Fuel allowance (20 000 Tanzanian shillings, approximately 12.75 USD) per extension worker per month
		Collecting data from volunteers to community mentor/EQUIP staff		Communication allowance (10 000 Tanzanian shillings, 6.40 USD, three extension workers with larger groups receive 15 000 Tanzanian shillings, 9.55 USD) for phone credit per month
Community-Level District Mentor	1	Learning sessions: plans and facilitates learning sessions and volunteer QI mentor meetings with EQUIP staff	Four days every three months (one day for preparation and one day for each of the three learning sessions that happen throughout the district)	Sitting allowance to attend and facilitate learning sessions (35 000 Tanzanian shillings, 22.30 USD) per learning session attended
		Mentoring and coaching: helps to facilitate monthly volunteer meetings	Five days per month with more added as required	Transportation provided by EQUIP
		Mentoring and coaching: oversees activities of extension workers through mentoring and coaching		Daily allowance (20 000 Tanzanian shillings, 12.75 USD) to attend and help facilitate monthly volunteer meetings and to conduct follow-up with extension workers per day worked per month
		Mentoring and coaching: collects data from each cluster from extension workers		Communication allowance (10 000 Tanzanian shillings, 6.40 USD) for phone

		Mentoring and coaching: conducts some village-level follow-up with volunteers		credit per month
EQUIP Staff	1	Mentoring and coaching: teaches QI to district and volunteer QI mentors	Employed full-time for EQUIP activities (40+ hours per week)	Salary
		Learning sessions: plans and facilitates learning sessions and volunteer QI mentor meetings with district mentor		
		Mentoring and coaching: conducts some village-level follow-up with volunteers		
		Other: administrative duties and overall monitoring and evaluation		
Uganda Village Volunteers	976 (two from each of 488 villages)	Action period: use PDSA cycles to create and implement change ideas; collect and present local data	Two days per month	No allowances provided by EQUIP
		Attendance of meetings each month	0.5 days per month	Transportation allowance and refreshment provision (11 500 Ugandan shillings, 4.80 USD) per volunteer per meeting attended

Community volunteer group members	144 (two from each of 72 parishes)	Learning sessions: each volunteer attends to problem solve and develop change ideas with support from mentors and EQUIP staff	One day every three months	Transportation allowance and refreshment provision (15 000 Ugandan shillings, 6.30 USD) per volunteer per learning session attended
		Action period: pass on education to other volunteers in each parish	Approximately two-to-three days per month	Motivation allowance (5500 Ugandan shillings, 2.30 USD) per volunteer per month
		Action period: use PDSA cycles to create and implement change ideas; collect and present local data		
Sub-District Mentors	30	Learning sessions: provide support to volunteers	1.5 days every three months (half a day prior to the learning session for preparation, one day for the learning session itself)	Fuel reimbursement (20 000 Ugandan shillings, $8.35 USD) per mentor per month
		Mentoring and coaching: facilitate monthly volunteer meetings	Typically three-to-four days per month	Daily working allowance (12 000 Ugandan shillings, 5.00 USD) per mentor per day worked each month
		Mentoring and coaching: collect data from each parish		
District Community Mentors	2	Learning sessions: plan and facilitate learning sessions and sub-district mentor meetings with EQUIP staff	6.5 days every three months (half a day for preparation, six days for the learning	Fuel reimbursement (45 000 Ugandan shillings, 18.80 USD) per mentor per month
				Daily working allowance (12 000 per day worked 5.00 USD) per mentor per day

				worked each month
		Mentoring and coaching: oversee activities of sub-district mentors		
		Mentoring and coaching: collect data from each sub-district mentor	sessions) per mentor	
EQUIP Staff	1	Mentoring and coaching: teaches QI to district and sub-district QI mentors	Typically 15 days per mentor per month	
		Learning sessions: plan and facilitate learning sessions with mentors	Employed full-time for EQUIP activities (40+ hours per week)	Salary
		Mentoring and coaching: attends mentor and some volunteer QI meetings		Transport to the field provided by EQUIP
		Other: administrative duties and overall monitoring and evaluation		

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Table 3.2 Process evaluation data collection methods and participants

Method	Participants	Timing	Total number	Male	Female	Participant characteristics
In-depth Interviews	Village volunteers	November 2012	8	4	4	Two from each of the four sampled villages; age range 21–52 years; most married, three of the younger volunteers unmarried; all literate; half have completed eleven or more years of education (form four leavers), half have only primary school education. Same participants interviewed twice, save for two who were replaced and one who was unavailable in 2013.
		October 2013	7	4	3	
	Volunteer group QI mentors (extension workers)	November 2012	2	1	1	Each responsible for two of the four villages, 52-years-old and 34-years-old. Same participants interviewed twice.
		October 2013	2	1	1	
	Village leaders	May 2013	4	4	0	One from each of the four sampled villages
	Health facility staff	October 2013	4	2	2	Each from the main referral health facility for each of the four sampled villages: two dispensaries, one health centre, and one district hospital; age range 26–58 years. Same participants interviewed twice, save for one who was replaced.
		May 2013	4	2	2	
	District community QI mentor	November 2012	1	1	0	Overall supervisor of community-level QI. Same participant interviewed twice.
		November 2013	1	1	0	
	EQUIP staff	December 2012	2	1	1	All EQUIP staff responsible for supporting community-level QI at various points in the intervention.
		November 2013	1	1	0	
	Mothers	May 2013	12	0	12	Age range 16–39 years; first child to fourth child; four home births, eight facility births.

Focus Group Discussions	Village volunteers	May 2013	3 focus groups	11	19	Representatives from 28 villages with one of the same extension workers as the four villages sampled for the process evaluation, but excluding volunteers from the four sampled villages. Six volunteers who participated in May focus groups also participated in November.
		November 2013	2 focus groups	5	9	
Birth Narratives	Mothers and Fathers	July 2013	19	7	12	Mothers: age range 17–44; first child to fifth child; eight facility births, four home births; one mother to twins. Fathers: age range 21–60; first child to eighth child; partners had four facility births, three home births.
		October 2013	17	6	11	Mothers: age range 18–41; first child to sixth child; seven facility births, four home births; one caesarean section. Fathers: age range 24–55; first child to eighth child; partners had three facility births, two home births, and one delivered on the way to the facility.
Key Informant Interviews	Non-governmental organisation representatives	July 2013	3 interviews	3	1	Four representatives from the three organisations identified by village leaders to be active in the four villages sampled as part of the process evaluation.
	Government representative	July 2013	1	1	0	One representative of the government social development initiative indicated by village leaders to be active in at least one of the four villages sampled for the process evaluation.

Uganda

In Uganda results are from a feasibility study conducted in March of 2013 in Mayuge district with the aim of assessing the acceptability and feasibility of the EQUIP intervention.

Study setting

Mayuge district borders Lake Victoria and has a population of approximately 412 500.(22) The major economic activities here are fishing and agriculture.(23) The maternal mortality ratio in the East Central region where Mayuge is located was 438 per 100 000 live births and the neonatal mortality rate was 23 per 1000 live births in 2011.(24)

The implementation of EQUIP and use of PDSA cycles in Uganda mirrored that of Tanzania, but with organisational differences. There were two EQUIP village volunteers from each of 488 villages in Mayuge, excluding 22 island villages, for 976 volunteers in total. Mayuge is sub-divided into 72 parishes (each representing approximately seven or eight villages). Two volunteer representatives were selected from each parish to make community-level volunteer groups that came together for learning sessions every three months, as in Tanzania. Two overall district community QI mentors and 30 sub-district-level mentors, who were employed by the government to oversee community mobilisation activities, supported these 72 QI teams and village volunteers (Table 3.1). In both countries, EQUIP tapped into pre-existing government employees present at the community-level.

Data collection and management

In-depth interviews were conducted in the Lusoga language by a trained interviewer with four village volunteers, five health facility staff, one government community development officer, and two district QI community and health facility mentors. Participants were purposively selected from a pool of individuals who had been active with EQUIP for a year or longer. Data collection tools were piloted and revised prior to data collection.

Data analysis

In both Tanzania and Uganda, translated scripts were read and re-read multiple times. An overall coding frame was developed, with codes added as the scripts were reviewed line-by-line. Data were coded and analysed with NVivo 9 software. Data were analysed between each data collection period, and interview and focus group guides were modified in order to follow-up on findings until all major emerging themes had been explored. A thematic analysis approach was conducted to draw relationships between codes and to generate themes from the data.(25) Although the number of points of data collection was pre-meditated, it was clear from the consistencies in participant responses that theoretical saturation had been reached. Representative quotations from themes were selected to display results.

Ethical Considerations

Written informed consent was sought from all participants. Where participants were not literate, a verbal explanation of the informed consent sheet was given with a literate witness present—the participant provided a thumbprint.

Results

The results are presented in three sections. The first describes how village volunteers were trained in QI and how they began to use new knowledge and research skills. The second demonstrates how volunteers were able to work complementarily with health facility staff through EQUIP. The third, with examples from Tanzania only, highlights perceived changing social norms around maternal and newborn health.

Village volunteers were trained successfully in quality improvement—a participatory research approach

Volunteers were trained in QI and the application of PDSAs at the first learning session. Subsequent learning sessions and monthly meetings were an opportunity to provide volunteers with more detailed knowledge and to teach them additional QI methodologies. Between November 2011 and July 2013, a total of four topics (focus areas of maternal and newborn health that village volunteers were educated about during learning sessions) were introduced in Tanzania and nine in Uganda (Table 3.3). EQUIP volunteers were taught to brainstorm around topics to identify problems in their communities and then to think of improvement objectives that were SMART: Specific, Measurable, Achievable, Realistic, and Time-bound.(26) Volunteers were then encouraged to design testable change ideas to meet these objectives. For many volunteers, this was the first time that they had thought in such a scientific way, and they perceived this to have helped them develop a new skill set.

"I mean, the knowledge I got from the project, if I compare with previous days, I am now well skilled." (In-depth interview, Tanzanian village volunteer, male)

Under the close guidance of QI mentors and EQUIP staff, volunteers were mentored to develop change ideas (Table 3.3) that were likely to be achievable. As a participatory research approach, volunteers indicated that they were responsible for creating change ideas through QI methods, and they appreciated those change ideas being tailored to their local context.

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Table 3.3 Change ideas generated by village volunteers to address selected topics in maternal and newborn health

Topic	Objective	Volunteer-Defined Change Ideas to Achieve Objectives
Tanzania		
Facility delivery	To increase the number of women going to health facilities for childbirth	- House-to-house visits with women and their husbands (sometimes also other family members) to provide education about the importance of facility delivery - Work with local leaders to enforce fines that penalise women who give birth at home - Work with local leaders to enforce fines that penalise traditional birth attendants who assist women to give birth at home - Work with traditional birth attendants to have them act as escorts for women in labour, bringing them to health facilities - Community sensitisation about facility delivery when babies are brought for growth monitoring[1] - Work with local leaders to provide education at village-level meetings
Birth Preparedness	To increase the number of women preparing all items needed for childbirth	- House-to-house visits with women and their husbands (sometimes also other family members) to provide education about birth preparedness - Ask women to confirm that birth items have been prepared - Community sensitisation about birth preparedness when babies are brought for growth monitoring - Work with local leaders to provide education at village-level meetings
Danger Signs	To increase the number of maternal and newborn danger signs known and responded to appropriately by	- House-to-house visits with women and their husbands (sometimes also other family members) to provide education about danger signs

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[1] Note: As many volunteers already had the responsibility of conducting growth monitoring, they used this opportunity as a platform to provide education. The women and/or girls bringing infants receive education here post-partum, which may contribute to community sensitization and overall trends in social norms. However, many volunteers also coupled this education with household visits to pregnant women and their families, who are the target of this intervention.

	women and their families	
Infection Prevention and Control	To increase the number of infection prevention and control strategies known and used by women and their families	- House-to-house visits with women and their husbands (sometimes also other family members) to provide education about infection prevention and control strategies
Uganda		
Antenatal Care Attendance	To increase the percentage of women attending four antenatal care visits	- Register all pregnant women and referring them for antenatal care services - Conduct community sensitisation meetings on the importance of antenatal care - Escort women to health facilities to attend antenatal care
Birth Preparedness	To increase the number of women preparing all items needed for childbirth	- Conduct home visits and educate women and their husbands - Develop a birth preparedness checklist for all registered pregnant women in the community - Form women's savings groups to ensure that money is available for birth preparedness and transport
Health Facility Delivery	To increase the percentage of women delivering in a health facility	- Register pregnant women in the community and refer them to delivery at the health facility using their expected delivery date - Remind women close to their expected delivery date to go to the health facility for delivery
Postnatal Care	To increase the number of women and infants receiving post-natal care within one week of delivery	- Use expected delivery dates to visit mothers and newborns after delivery for post-natal care
Immunisations	To increase the percentage of infants immunised against polio and tuberculosis at birth	- Immediate referral of all newborns for immunisation
Care for Low-Birthweight Babies	To increase the percentage of low birthweight	- Conduct community demonstrations of kangaroo mother care using low birthweight babies

	newborns identified and followed up with kangaroo mother care	
Delayed Bathing of Infant After Delivery	To increase the percentage of newborns whose first bath after delivery was delayed by at least 24 hours	- Community sensitisation through meetings on delayed bathing
Exclusive Breastfeeding	To increase the percentage of newborns being exclusively breastfed	- Community sensitisation through meetings on exclusive breastfeeding - Use role models ("expert clients") in the community using exclusive breastfeeding to give testimonies
Recognition and Referral for Newborn Danger Signs	To increase the percentage of newborns referred to and receiving care at a health facility for danger signs	- Escort patients to the health facility

"I have the authority [to develop change ideas] because we are in this community, so we understand which methods work so that we can capture the community…it is not possible for a person to come from somewhere else and establish methods here at [village name]; I don't think she can." (In-depth interview, Tanzanian village volunteer, female)

Volunteers tested their change ideas by first applying them with a few people, then data were collected to determine if the change idea worked. If so, it was applied across their community and then continually monitored. In particular, the emphasis on defining measureable objectives with appropriate numerators and denominators allowed volunteers to appreciate how data could be collected to test and monitor change ideas. Furthermore, if volunteers recognised through testing that change ideas were not successful, they quickly moved to adapt their change ideas or to start again with a new one.

"After making the education reach the targeted group [pregnant women in my village], I will collect statistics that will enable me to understand how the situation is after the [test] is over. I will compare the initial data with the current data that I have to see how they are." (In-depth interview, Tanzanian village volunteer, male)

"Yes, we change [our change ideas after testing]. For example, we planned that we can educate [women] during the clinic health day [where babies are weighed], but…[we found] when you provide education [there], it is not sufficient, since the ones who bring the babies for weighing are young kids, so we saw that we should change that change idea, because if you educate those who bring them and they are young, how will she understand anything?"(In-depth interview, Tanzanian village volunteer, male)

Fines against both mothers who delivered at home and against traditional birth attendants who may have helped them to do so were used widely across the intervention district in Tanzania by village volunteers after they perceived the success of other volunteers using this approach. In some villages, however, volunteer change ideas focussed on creating a new role for traditional birth attendants in which they were called upon to confirm a woman's labour and help to escort her to a health facility.

"The traditional birth attendants also understood us, and in the community there is no one who dares [to deliver at home]. If the labour pain starts, they go to the dispensary or hospital…the one who has been told to go and give birth at the big hospital goes there directly and nobody dares to deliver a mother at home." (In-depth interview, Tanzanian village volunteer, female)

It should also be noted that in practice, there were opportunities for negotiation around fines.

"I didn't provide [the fine]…because [the health facility staff] are careless. They are the ones who were not around on that day…when [my husband] went [to speak with the village executive officer], he explained the situation and it was found that [the health facility staff] was the one at fault." (Birth narrative, Tanzanian mother)

Data around the objectives targeted by change ideas were summarised monthly and presented as run charts (Figure 3.2), which were typically shared between volunteers at

monthly meetings and also at learning sessions. Being responsible for collecting and presenting data was recognised by volunteers as a role that they valued and also one that increased their sense of importance within the intervention.
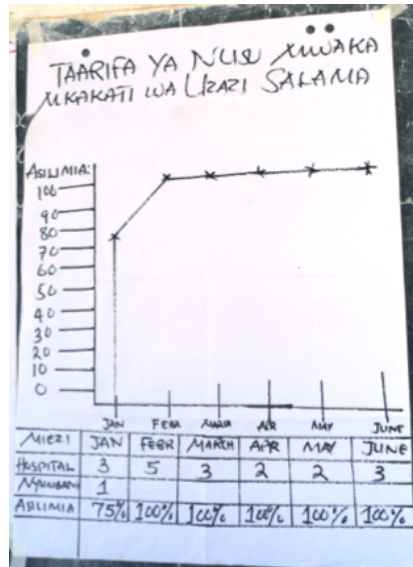
Figure 3.2 Photograph of an example run-chart (Taarifa ya nusu mwaka ya mkakati wa uzazi salama: half-year report of the safe delivery strategy) from a village in Tanzania showing the number of hospital (hospitali) and home (nyumbani) births with calculations of the percentage (asilimia) of facility deliveries over a six-month period

"Our reports are very important. When we submit reports they are very important here at [village name]." (In-depth interview, Tanzanian village volunteer, male)

However, consistent, correct data collection and documentation was a struggle in both countries due to the unfamiliarity of volunteers with such tasks. When run charts were initially introduced to volunteers, the majority were unable to grasp how to calculate percentages and plot them correctly. Additionally, in both countries, understanding the meaning of QI methodologies, for example, applying PDSA cycles, was an ongoing challenge. Follow-up with volunteers was therefore done not only as part of mentoring and coaching on QI methods, but also to verify that activities linked to change ideas were being carried out as planned, and to ensure volunteer-collected data and plotting of run charts was correct.

"[Data] shows the progress of our work, where we are improving or declining. It urges us [volunteers] to work hard and achieve our objective. I like [collecting data] because it guides me to do what I am supposed to do. However, it is not easy to calculate the percentages and plot the graphs, even if we can read and write." (In-depth interview, Ugandan community-level QI volunteer)

"At first it was very difficult to understand and use the cycles because we are slow learners, but due to monthly mentoring sessions, we continued using the cycles and finally grasped it." (In-depth interview, Ugandan community-level QI volunteer)

Although volunteers experienced challenges in terms of mastering the QI work, and sometimes in gaining acceptance at the household level in their communities, overall, they appeared to be very satisfied with their participation in the intervention. The most commonly cited benefits to them personally centred on the appreciation of new skills and knowledge. Helping to improve maternal and newborn health and contributing to development in their communities were also key benefits that volunteers recognised in doing this work.

"[EQUIP] has its importance because all in all, human beings are supposed to have good health. If one has [good health] then they will be able to work and we will develop as a nation…When I had started [in EQUIP] I didn't know about problems associated with babies and mothers, but as time went by, I understand, and [EQUIP] is important for [them]." (In-depth interview, Tanzanian village volunteer, male)

Community members and health facility staff worked complementarily to provide education to community members to improve health-seeking behaviours
Health facility staff were aware of and appreciated village volunteers and have noted the importance of their involvement.

"They have helped because now all pregnant women attend the health facility. They also tell traditional midwives not to help pregnant women to deliver at home, but to take them to the hospital for delivery." (In-depth interview, Tanzanian health facility staff, female)

Ninety-six percent of women in Tanzania and Uganda access antenatal care in a health facility at least once during pregnancy.(21, 27) Antenatal health education messages promoting health facility delivery and birth preparedness were the same as those promoted by EQUIP community volunteers. For example, community volunteers reiterated the education through a home visit, and checked that all birth items had been prepared prior to the woman's expected delivery date. The shortage of health workers in many facilities also meant that, in lower-level facilities especially, volunteers directly took on a supportive role at the facilities, assisting with educational messaging.

"When the [delivery] date nears, I ask her if all the [delivery items] are there, and if possible, she brings them outside to show me. In your book you put a tick to say that the mother has already prepared herself to go and give birth at the health facility." (In-depth interview, Tanzanian village volunteer, female)

"I am here at the health centre as a volunteer to educate women. I come here on antenatal care days, sometimes on immunisation days to help educate women because people are many on those days. I help to educate them especially since health workers arrive late and don't have time to educate the women." (In-depth interview, Ugandan community-level QI volunteer)

Additionally, in Tanzania, health facility and community-level QI teams were encouraged to collaborate through monthly joint meetings in which they were able to discuss what each was working on and provided support where possible.

In Tanzania, there were instances of health facilities upholding village volunteer change ideas, for example by refusing to give a health card for babies delivered at home until women paid their fine to village leaders.

"Most of the time, we tell them you cannot get the card for your child until you go and see the village executive officer and explain to him as to why you delivered from home." (In-depth interview, Tanzanian health facility staff, male)

Despite the positive perception of health facility staff that health facility deliveries were increasing due in part to the work of the community-level EQUIP volunteers, they also noted the challenge of meeting increased demand. Community-level QI volunteers in both countries and mothers and fathers in Tanzania reiterated this concern and

suggested that if women could not rely on health workers being present at facilities when they are ready to deliver, they were motivated to deliver at home with a traditional birth attendant.

"The great work done by the [village volunteers] resulted in huge numbers of women attending antenatal care and also delivering at facilities, which is great. However, it also has a down side that we had a few staff who were overwhelmed." (In-depth interview, Ugandan district-level QI volunteer)

"I gave birth at home because, first, it was not a working day, second, there was not any worker at the health facility." (Birth narrative, Tanzanian mother)

These experiences highlight the importance of engaging both demand and supply sides of maternal and newborn health services, and presents a barrier that could potentially be overcome through the district-level QI teams who are responsible for resource allocation.

Emphasis placed on maternal and newborn health has helped to change social norms around maternal and newborn health at the village level in Tanzania

A key factor that enabled EQUIP in volunteers' respective communities was the receptiveness and support of local leadership. Local leaders assisted volunteers by introducing them at community meetings, providing them with a community-wide platform to share their messages, follow-up their QI work, and in some instances, attending learning sessions and monthly meetings to help volunteers develop change ideas and work plans. By engaging local leaders, the receptiveness and acceptance of the EQUIP intervention by community members increased, which primed the community for many of the changes advocated for by EQUIP.

"Yes, the villagers know the presence of this intervention because first we had introduced the volunteers in the various meetings. [We have been] sensitising [households] that they should participate in all the activities that are being performed in the village." (In-depth interview, Tanzanian village executive officer, male)

Interviews with community members suggested that attitudes towards home births, traditional healers, and traditional birth attendants were becoming increasingly less

favourable, with women and their husbands seeing them as potentially dangerous, relying on them only as a last resort. This change in thinking was reported to be partly attributable to the change ideas created by village volunteers that educated pregnant women and their families and prompted local leaders to actively move to sensitise traditional birth attendants and to dissuade pregnant women from accessing them.

"The traditional birth attendants are no longer working…it becomes difficult for a woman to give birth at home because they will not get assistance." (In-depth interview, Tanzanian village volunteer, male)

"Before, there were a lot of newborn and maternal deaths because of poor service from traditional birth attendants. Now many women are knowledgeable, also, many go to the health facility for delivery." (In-depth interview, Tanzanian mother)

Another emerging community-wide change during the study period was the inclusion of men in maternal and newborn health. In many of their change ideas, EQUIP village volunteers made a point of including partners and other family members when giving women education to ensure that they would enforce what was taught. In many instances, men were responsible for household financial resources and were therefore entrusted to purchase delivery items and to arrange money for transport when their partners went into labour. Men accepted this role and became more sensitised to their inclusion in maternal and newborn healthcare.

"Men now cooperate in implementing [change ideas]; they cooperate with their families in buying items for delivery. In the past, it was a secret. When a woman was pregnant, men were not supposed to be involved in preparations, but now we are really together with men." (In-depth interview, Tanzanian village volunteer group QI mentor, male)

Discussion

Community-level QI is a participatory research approach that has engaged volunteers in Tanzania and Uganda, putting them in a central position within local health systems to improve community-level maternal and newborn health practices and increase the demand for health services. Results from our process evaluation in Tanzania and feasibility study in Uganda have identified multiple effects of community-level QI. Village volunteers have engaged with demand and supply side issues in maternal and newborn health, linkages between health facilities and communities have been strengthened, and complementary messaging from both health facilities and communities to improve birth preparedness and care-seeking for facility delivery were enabled.

The World Health Organization suggests that health systems encompass anything that promotes, maintains, or restores health.(28) By putting people at their centre, health systems can be made more responsive and accessible.(29) EQUIP's community-level QI, therefore, is a valuable addition to local health systems. Furthermore, health systems benefit from synergy between both supply- and demand-side factors. For example, studies have found that an increase in skilled attendance at delivery may not affect maternal mortality if attendants are not adequately trained and if resources and a functioning referral system are not also present.(30, 31) EQUIP stands as an example of an intervention that facilitates community and health facility cooperation for health systems strengthening through coordinated demand and supply side actions.

Alongside other community-based interventions and initiatives, EQUIP's village volunteers were observed to play a part in changing social norms around traditional practices related to maternal and newborn health. The importance of engaging community members when trying to target health-seeking behaviours has been acknowledged across multiple settings.(32-34) Social norms are reflected in an individual's health decisions, as they are likely to behave according to how the community will view his or her actions.(33) Therefore, QI that engages community members to improve health-seeking behaviours may also succeed in helping to positively change social norms in ways supply side interventions alone cannot. EQUIP is one of several community-level interventions to focus on maternal and newborn health. Therefore, women and their families received similar information from multiple

sources, which, although perhaps a nuisance, allowed for the reinforcement of messaging. Thus, the momentum of changing norms around maternal and newborn health could be built and sustained collaboratively.

The use of PDSA cycles within EQUIP is similar to participatory action cycles, examples of which have been reported in the context of maternal and newborn health elsewhere.(35-39) However, although both participatory action cycles and QI using PDSA cycles engage users in monitoring and evaluation, PDSA cycles centre around the testing of change ideas, which are trialled on a small scale, assessed for improvement, and only then scaled up. Furthermore, QI is an iterative process. In the learning sessions that occur before each action period, a new topic is introduced, and volunteers will develop change ideas around these. However, the interventions from past change ideas are still implemented. Therefore, the overall impact of QI comes from the cumulative impact of each change idea introduced throughout the course of the intervention. Of the three examples of community-level QI mentioned in the introduction, only the intervention in Ethiopia reported engaging community members using methods similar to the PDSA cycles within EQUIP. However, the primary aim was to improve community health worker performance, which, in turn, would lead to improved care-seeking from community members. In the Ethiopia intervention, health-seeking behaviours related to antenatal care, health facility delivery, and post-natal care increased.(14) Our results indicate that the use of PDSA cycles by village volunteers enabled responsiveness to context-specific maternal and newborn health problems. Real-time data collected by volunteers to monitor change ideas suggested that, here too, health-seeking behaviours around maternal and newborn health were improving. Qualitative data highlighted the perceptions of mothers, fathers, village leaders, and health facility staff, which also suggested that facility births and birth preparedness in particular were increasing. A planned impact evaluation will assess whether these perceived increases are measurable, of public health relevance, district-wide, and attributable to community-level QI.

A necessary consideration within participatory research interventions like EQUIP is the unique ethical concerns that may arise, particularly when trying to respect the autonomy of community members in decision-making.(40, 41) For example, outsiders may perceive some of the change ideas indicated in Table 3.3 as being harsh, or even unethical; in particular, the use of fines against women who deliver at home in

Tanzania. There is the temptation to appeal to western-held standards of conduct, which may not be conducive to participatory methods.

With over 300 village volunteers in Tanzania and almost 1000 in Uganda, supporting them to apply QI methods required extensive mentoring and coaching by EQUIP staff and QI mentors, with considerable human resource and financial implications. A detailed costing analysis will follow. Working within existing structures that recognise the contribution of volunteers may present part of the solution. Additionally, mentorship in both countries was provided by pre-existing government employees, suggesting some future potential for their routine work to be adapted to encompass QI.

Limitations

In Tanzania, data was collected from only four villages, although strong consistency of responses from volunteers throughout additional villages in Tandahimba during focus group discussions and confirmation of findings with EQUIP staff and QI mentors suggest that these results are likely transferrable throughout the intervention district. The Ugandan study focussed on the feasibility of the EQUIP intervention and as such, was less comprehensive than that of Tanzania.

As implementation of the EQUIP intervention continued beyond the data collection periods of the studies here (November 2012–November 2013 in Tanzania and May 2013 in Uganda), later insights gained may move beyond those expressed in this paper. Furthermore, despite efforts to verify volunteer data wherever possible, with such a large number of volunteers between both countries, it is likely that not all data is checked as thoroughly as it should be. Therefore, there may not be accurate representation of local data in all run charts, and it is probable that not all run charts are plotted correctly. To overcome this limitation, ongoing validation of data collected by volunteers and plotted by volunteers is essential.

Conclusion

Community members can be engaged to use PDSA cycles as part of the QI participatory research approach. This approach has enabled them to address their health problems, to stimulate engagement with health facility staff, and to contribute positively to changing social norms. However, the amount of mentoring and coaching needed could be challenging in some settings. Community-level quality improvement has put people at

the centre of the health system where community members recognise important benefits to their individual capacity as well as to maternal and newborn health outcomes.

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Student	Tara Tancred
Principal Supervisor	Tanya Marchant
Thesis Title	Implementation of community-level quality improvement in southeastern Tanzania: a mixed methods process evaluation of what worked, what didn't, and why?

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SECTION C – Prepared for publication, but not yet published

Where is the work intended to be published?	Chapter 4 (Facilitators and Barriers of Community-Level Quality Improvement in Tanzania) has been submitted to "Qualitative Health Research"
Please list the paper's authors in the intended authorship order:	Tara Tancred, Fatuma Manzi, Joanna Schellenberg, and Tanya Marchant
Stage of publication	Under review

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary)	The study was conceptualised, carried out, and analysed by me. I wrote the first draft of the paper.

Student Signature: _____ Date: 31/07/15

Supervisor Signature: _____ Date: 31|7|15

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Chapter 4

Research Paper 2: Facilitators and Barriers of Community-Level Quality Improvement in Tanzania

This chapter explains the process evaluation that was used to study the implementation of the EQUIP intervention at the community level in-depth. This chapter then describes the analysis of the process evaluation through the use of implementation scores in order to rank sampled villages according to their implementation performance. Key facilitators of community-level quality improvement are presented based on factors that tended to be more present in high- and absent in low-performing villages. Finally, this chapter highlights the importance of process data in complex behaviour change interventions such as EQUIP. This chapter has been submitted to Qualitative Health Research for their call for papers around "*Qualitative Contributions to Quantitative Inquiry*" and is currently under review.

Title

Facilitators and Barriers of Community-Level Quality Improvement in Tanzania

Authors

Tara Tancred, Fatuma Manzi, Joanna Schellenberg, and Tanya Marchant

Abstract

A quality improvement intervention for maternal and newborn health was carried out in southern Tanzania at the community level. It sought to improve health-seeking behaviours and uptake of community-level maternal and newborn health practices. A process evaluation populated using data primarily from in-depth interviews and focus group discussions with the intervention's implementers was undertaken in four villages receiving the intervention to: evaluate the intervention's implementation; uncover facilitators and barriers of quality improvement; and highlight contextual factors that might have influenced implementation. Performance implementation scores were used to rank the villages. Identifying higher and lower performing villages highlighted key facilitators and barriers to community-level quality improvement related to: support from local leaders; motivation through use of local quality improvement data; and regular education around quality improvement and maternal and newborn health. These findings can be taken formatively in the design of similar interventions in the future.

Introduction

Quality improvement is a widely used management approach that engages individuals from the bottom-up in strategizing to resolve problems within a process.(1, 2) When applied to healthcare, quality improvement methods are commonly used at the administrative and facility levels in high-income settings, but are becoming increasingly popular in low-income country settings also.(3-6) The literature on the evaluation of quality improvement initiatives draws on a variety of methods but also hails predominantly from higher-level health facilities in high-income country contexts (see examples (7-12)).

There is a paucity of literature available about the evaluation of quality improvement initiatives in low-income country settings, especially at the community level (see examples (13-15)). In addition, there is also a dearth of data specifically around the implementation or processes of quality improvement initiatives in low-income country settings, which largely report on impact (see examples (16-20)). As such, there is also little reported about study designs that aim to capture the implementation of community-level quality improvement in these settings.

The Expanded Quality Management Using Information Power (EQUIP) intervention applied quality improvement methods at the district, health facility, and community levels in Tandahimba district in southern Tanzania from 2011–2014.(21) The overall aim of EQUIP was to improve both the supply of and the demand for quality maternal and newborn health services. At the district level, quality improvement methods were used to address administrative and resource-related barriers around the provision of maternal and newborn health care. At the health facility level, EQUIP aimed to improve the quality of maternal and newborn health services provided. Finally, at the community-level, quality improvement methods were centred around improving household-level maternal and newborn health practices and creating increased demand for services, primarily through the promotion of health facility delivery and birth preparedness.

We aimed to use a method that could be used to capture the complexity of community-level quality improvement and study its implementation in detail. Ultimately, EQUIP was a behaviour change intervention that sought to build capacities in community

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members to use quality improvement to then help change the behaviours of other community members around maternal and newborn health. Therefore, to understand the perceptions and motivations for the behaviours of both those engaged in implementing quality improvement and those affected by their problem-solving strategies, the use of qualitative methods was essential.(22) Process evaluations, which have the flexibility to draw from multiple data sources, both quantitative and qualitative, have been found by others to be a particularly useful study design for studying the implementation of quality improvement initiatives.(23)

To study the implementation of community-level quality improvement in EQUIP, we developed a process evaluation framework adapted from Linnan and Steckler and Saunders et al.(24, 25) This process evaluation used quantitative data around routine aspects of implementation. Qualitative data were then used to gain important insights into the perspectives of implementers and targets of the quality improvement activities. The objectives of this process evaluation were:

1. To understand the extent to which six process components (fidelity, completeness, exposure, reach, satisfaction, and recruitment) were carried out in each village as planned;
2. to describe contextual factors that might affect implementation of EQUIP; and foremost
3. to uncover the primary facilitators and barriers of the EQUIP intervention at the community level.

Here we present findings from a process evaluation of community-level quality improvement in four villages receiving the EQUIP intervention in southern Tanzania.

Methods

Study Setting

The EQUIP intervention took place from November 2011–April 2014 in Tandahimba district in southern Tanzania. Briefly, Tandahimba is a predominantly rural district with approximately 227 500 people,(26) where maternal and newborn mortality (712 deaths per 100 000 live births and 31 deaths per 1000 live births respectively) are higher than the national averages.(27, 28) The most common economic activity is farming of cashew nuts and the predominant ethnic group are the Makonde.(29, 30) The study setting has been described in greater detail elsewhere.(21)

Community-Level Intervention

Within Tandahimba district, village leaders or community members from all 157 villages selected two volunteers to carry out quality improvement activities. Volunteers were responsible for identifying key problems related to maternal and newborn health in their communities, developing strategies called "change ideas" to address those problems, tracking progress in whether the problem was successfully resolved by the change idea, and either developing alternative change ideas or moving on to address other problems. This process of creating, testing, and modifying change ideas is called the plan-do-study-act (PDSA) cycle, which has been previously applied in both industrial and health care settings.(31, 32) Volunteers met in two ways: First, they met every three months with volunteers from other teams at educational meetings called learning sessions. Second, volunteers also came together on a monthly basis to receive mentoring and coaching from their quality improvement team supervisor—called an extension worker—and to engage in peer learning, sharing data related to their progress and other experiences.

Representatives from health facility quality improvement teams were also present at these monthly meetings. As such, the primary volunteer activities of community-level quality improvement were: attending learning sessions; attending monthly meetings; and creating, implementing, testing, and monitoring change ideas using PDSA cycles. For more information, community-level quality improvement within EQUIP is described in greater detail elsewhere.(33)

Process Evaluation Methods

We conducted a mixed methods process evaluation during the second year of the community level quality improvement intervention, November 2012–November 2013. Within this process evaluation, we specifically looked at fidelity, completeness, exposure, satisfaction, reach, recruitment, and context; the first six components are described in Table 4.1 with a summary of contextual data collected shown in Table 4.2. Although these components are commonly found in process evaluations applied to vastly different interventions, each is populated by intervention-specific measures, making process evaluations a highly adaptable study design.

Individual measures were kept as objective as possible, being directly observable (e.g. number of meetings attended) or being able to be confirmed through triangulation across more than one quantitative or qualitative data source to the greatest extent possible. For example, within the component "Fidelity", the measure, "village volunteers understand and can apply PDSA cycles" was confirmed through observation of volunteers at learning sessions or monthly meetings and also by having volunteers directly explain the PDSA cycle and how they apply it to their work during in-depth interviews.

Table 4.2 highlights the expected direction of the effect of contextual factors within each village on EQUIP implementation—and by extension, on intermediate outcomes linked to the EQUIP intervention such as birth preparedness and birth in a health facility. Whether the contextual factor would have a hypothesised positive (+) or negative (-) effect is indicated. The number of symbols, to a maximum of three, indicates the strength of the effect. For example, the expected effect, "Villages whose volunteers are longstanding residents (more than 10 years) are likely to be better performers than those with volunteers who are newer residents" was given +++ in Village A, where both volunteers were born in the village and had remained there for their entire lives. However, in Village C, one volunteer had been in the village for seven years after getting married there, and the other had been in the village for approximately 10 years, so it was given only one +.

Table 4.1 Simplified process evaluation framework measures and associated implementation scores

Framework component	Description within the context of EQUIP	Measure	Score	Data source(s)
Fidelity	The extent to which the intervention was implemented as planned	Village volunteers self-identify new knowledge or skills in quality improvement and maternal/newborn health they have acquired	/4	In-depth interviews with volunteers
		Village volunteers understand and can apply PDSA cycles	/4	In-depth interviews with volunteers, extension workers, and EQUIP staff
		Change ideas generated by village volunteers	/4	In-depth interviews with volunteers
		Change ideas implemented by volunteers	/4	In-depth interviews with volunteers
		Local resources are mobilised to implement change ideas	/2	In-depth interviews with volunteers and village executive officers
		Data for each change idea is collected consistently and correctly	/4	In-depth interviews with volunteers
		Real-time data is used by volunteers to influence change ideas	/4	In-depth interviews with volunteers
		Village volunteers feel enabled by EQUIP	/4	In-depth interviews with volunteers
		Extension worker feels a sense of ownership of the intervention	/1	In-depth interviews with extension workers
		Village volunteers feel a sense of ownership of the intervention	/4	In-depth interviews with volunteers
		Village volunteers aware of health facility quality improvement teams' activities	/2	In-depth interviews with volunteers
		Referral health facility quality improvement teams aware of community quality improvement teams' activities	/2	In-depth interviews with health facility staff

		Community- and health facility quality improvement team members describe a positive interaction between them	/2	In-depth interviews with volunteers and health facility staff
TOTAL			**/41**	
Completeness	The extent to which the intervention was distributed (i.e. the number of activities carried out)	100% of learning sessions attended by at least one village volunteer	/4	EQUIP process data, in-depth interviews with volunteers
		At least one village volunteer has attended 100% of monthly meetings	/2	EQUIP process data, in-depth interviews with volunteers
		Village volunteers regularly submit reports (at least once/month) and engage with their extension worker	/2	EQUIP process data, in-depth interviews with volunteers and extension workers
		Change ideas implemented consistently	/4	EQUIP process data, in-depth interviews with volunteers and extension workers
TOTAL			**/12**	
Exposure (dose received)	The extent to which intervention implementers (village volunteers and extension workers) and targets (community members) actively engage with or are receptive to the intervention	Village volunteers are receptive to the EQUIP intervention	/2	In-depth interviews with volunteers
		Community members (leaders and pregnant women and their husbands) are receptive to village volunteers	/2	In-depth interviews with recently delivered women, birth narratives with mothers and fathers
		Village volunteers have made contact with their broader community (e.g. Invited to speak at community meetings)	/2	In-depth interviews with volunteers and village executive officers
TOTAL			**/6**	
Reach	The proportion of intended targets of change ideas	Percentage of women	/4	Process data from volunteer record

		delivering in a health facility since intervention start		books and EQUIP record books
	actually receiving the intervention	Percentage of women preparing all delivery items since intervention start	/4	Process data from volunteer record books and EQUIP record books
		A selection of recently delivered women can identify both village volunteers in their community	/2	In-depth interviews with recently delivered women, birth narratives with mothers
		A selection of recently delivered women are aware of EQUIP activities (can name at least 1) in their village	/2	In-depth interviews with recently delivered women, birth narratives with mothers
TOTAL			**/12**	
Satisfaction	The extent to which implementers (village volunteers and extension workers) and targets of change ideas (community members) are satisfied with the intervention	Both village volunteers express a high level of satisfaction in their role	/2	In-depth interviews with volunteers
		Both village volunteers perceive their role to be valuable	/2	In-depth interviews with volunteers
		Village volunteers identify benefits of the intervention (either no harms mentioned, or benefits must outweigh or outnumber harms)	/2	In-depth interviews with volunteers
		Extension worker indicates a high level of	/1	In-depth interviews with extension workers

		satisfaction in his/her role		
		Extension worker perceives his/her role to be valuable	/2	In-depth interviews with extension workers
		Extension worker can identify benefits of the intervention (either no harms mentioned, or benefits must outweigh or outnumber harms)	/1	In-depth interviews with extension workers
		The selection of recently delivered women indicate a high level of satisfaction with the intervention in their village	/2	In-depth interviews with recently delivered women, birth narratives with mothers
		The selection of recently delivered women can identify at least one positive change in their village	/2	In-depth interviews with recently delivered women, birth narratives with mothers
		The selection of recently delivered women can identify benefits of the intervention	/2	In-depth interviews with recently delivered women, birth narratives with mothers
TOTAL			**/16**	
Recruitment	Procedures used to attract and sustain participants	Both village volunteers are from the village they are active in	/2	In-depth interviews with volunteers
		Village volunteers are satisfied with the selection process	/2	In-depth interviews with volunteers
		Extension worker is from a community that he/she supervises	/1	In-depth interviews with extension workers

		Extension worker is satisfied with his/her selection process	/1	In-depth interviews with extension workers
		Village volunteers have previous community involvement	/2	In-depth interviews with volunteers
		Extension worker has had previous community involvement	/1	In-depth interviews with extension workers
		Village volunteers can identify at least two incentives to sustain their involvement	/2	In-depth interviews with volunteers
		Extension worker can identify at least two incentives to sustain his or her involvement	/2	In-depth interviews with extension workers
TOTAL			**/13**	
OVERALL TOTAL			**/100**	

Table 4.2 Hypothesised effects of contextual factors on the implementation of EQUIP in villages A–D

Contextual Factor	Comment	Data source	Expected effect of contextual factor on EQUIP implementation	Hypothesised effect of contextual factor in each village			
				Village A	Village B	Village C	Village D
Volunteer features	How long they have been residents of the village	In-depth interviews with volunteers	Villages whose volunteers are longstanding residents (more than 10 years) are likely to be better performers than those with volunteers who are newer residents	+++	++	+	++
	Past experience volunteering	In-depth interviews with volunteers	Villages whose volunteers have past volunteering experience likely to be better performers than those with volunteers lacking past experience	++	+	+	+
	Maternal and newborn health	In-depth interviews with volunteers	Villages whose volunteers have pre-existing maternal and newborn health knowledge/skills likely to be better performers than those with volunteers lacking such knowledge/skills	++	+	+	+
	Quality improvement skills and knowledge previously held	In-depth interviews with volunteers	Villages whose volunteers have pre-existing quality improvement knowledge/skills likely to be better performers than those with volunteers lacking such knowledge/skills	-	-	-	-

Factor	Indicator	Method	Hypothesis				
Volunteer turnover	Why it happened (if at all) and how it was dealt with	In-depth interviews with volunteers, extension workers, and village executive officers	Villages *without* volunteer turnover likely to be better performers	+	+	-	-
Location	Distance from main road and health facilities	In-depth interviews with village executive officers	Villages closer to main roads and health facilities (especially higher-level health facilities like health centres and the district hospital) will be better performers than villages further from main roads and health facilities	++	+	+	+++
	Condition of roads	In-depth interviews with village executive officers	Villages with better roads likely to be better performers than villages with poorer quality roads	+++	++	+++	-
Socio-economic factors	General condition of housing (thatched roofs or corrugated iron mud or brick), primary economic activities, water source, location to markets or trading centres, and so fourth	Social and resource mapping, in-depth interviews with village executive officers	Villages that generally have better socioeconomic conditions will be better performers than villages with poorer socioeconomic conditions	+	+	++	+++

Interaction with closest health facility	Indicate the closest health facility and how staff interact with EQUIP volunteers, if at all	In-depth interviews with village volunteers, village executive officers, and referral health facility staff	Villages whose volunteers interact with health facility staff from local health facilities will be better performers than those who do not interact with health facility staff	++	++	+++	-
Other contextual factors	Other health and social development activities happening in the village	In-depth interviews with village executive officers, key informant interviews with non-governmental organisation and government staff indicated as active in each village	Villages in which there are other social development and/or maternal and newborn health initiatives will be better performers than villages who lack additional initiatives	++	++	+++	++
Total expected effect of contextual factors				+16	+12	+12	+9

Sampling

Implementation in four villages was studied due to the logistical constraints of the large amount of data collection required for the process evaluation. These villages were selected to be diverse with regard to: level of nearest health facility (dispensary, health centre, or hospital); distance to nearest health facility; distance to main roads; primary economic activities, predominant religion; and volunteer characteristics, namely the age, sex, and past volunteering experiences of the volunteers.

Data Collection and Management

Quantitative data were collected from routinely kept records on volunteer activities. These included: learning session and meeting attendance; number of change ideas implemented in each village; number and percentage of targets reached through change ideas in each village; and numbers and percentages linked to process outcomes, for example, the percentage of women making birth preparations or giving birth in a health facility each month. Qualitative data were collected from semi structured in-depth interviews with volunteers (10—including eight original volunteers and two replacements), extension workers (2), mothers (12), health facility staff (4), village leaders (4), the overall district mentor (1), and EQUIP staff (3). Birth narratives with recently delivered mothers (23) and fathers (13) were also conducted. Birth narratives differed from in-depth interviews in that they were much less structured and allowed participants to discuss whatever aspects of their or their partner's experiences with pregnancy, childbirth, and newborn care were of most importance to them. To gather contextual data, we also carried out social and resource mapping in each village and conducted follow-up key informant interviews (3) with non-governmental and governmental representatives from health or development projects in the sampled villages.

For qualitative data, in-depth interviews or birth narratives typically lasted 30–60 minutes. From these, data were transcribed verbatim from audio files and translated by fluent English-Swahili speakers.

Analysis

The process evaluation framework provided a basis for implementation scores. For each measure within the framework components, a score was assigned (Table 4.1). The weight given to each score was determined based on the importance of each measure

according to the intervention's design and quality improvement theory out of a maximum of four. For example, for the framework component "Completeness", it was very important that all learning sessions were attended by at least one volunteer, and this measure was weighted to have a score out of four. It was less important that all monthly meetings between learning sessions were also attended by at least one volunteer, and this measure was weighted to have a score out of two. Assuming four learning sessions per year, if one learning session was missed, the score would be 3/4, if two were missed, it would be 2/4, if three were missed it would be 1/4, and if no learning sessions were attended, it would be 0/4. For monthly meeting attendance, assuming eight monthly meetings in a year, if all eight were attended, the score would be 2/2, but if only four meetings were attended, it would be 1/2. Using mixed methods to help triangulate findings across data sources as indicated above helped to make scores as accurate as possible. Scores for each component were added together for each village to generate a total score that reflected their performance implementing quality improvement.

Once scores were generated, they were used to rank the four villages according to their quality improvement performance, yielding two high-performing villages, and two low-performing villages. Using predominantly qualitative data collected to populate the process evaluation framework, these villages were analysed independently of one another for facilitators and barriers of the intervention in each. Overall facilitators of the intervention were those that were most prevalent in the high performing villages and which were lacking in the low-achieving villages, or that were found to be facilitators in all four villages. Overall barriers were those that were lacking in high-performing villages, that impeded implementation in low-performing villages, or that were highlighted in all four villages.

The use of implementation scores alongside the process evaluation was validated in the following ways: Because the process evaluation was tailor-made for the EQUIP intervention, each feature of implementation was explicitly drawn out according to the intervention's design. Therefore, these scores have a high degree of face validity. Consultation with a quality improvement expert about each of the measures within the process evaluation framework as well as an extensive review of quality improvement literature also ensured that we were focussing on the most crucial aspects of implementation—such as village volunteer-led change ideas, consistent testing of

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change ideas and use of PDSA cycles, regular learning session attendance, and regular reporting and use of local data. Additionally, accepted measures of community participation—for example measures of local management, local supervision, local resource mobilisation, and so forth, to evaluate the extent to which this intervention was also community-led provided a reasonable degree of content validity.(34-40)

For qualitative data, using NVivo 10 software, translated scripts were coded line-by-line to generate as many codes within each component as possible. A deductive thematic analysis was then undertaken using an initial coding framework that linked to seven components of the process evaluation (the six indicated previously that were assigned scores: fidelity, completeness, exposure, reach, satisfaction, and recruitment, and also context), which were reduced to draw out key themes within each.(41) Quotations presented in the results that follow are representative of these themes.

Ethics

Ethics approval for this study was granted by the ethics review boards of the London School of Hygiene and Tropical Medicine, Ifakara Health Institute (Tanzania), and the Tanzanian National Institute for Medical Research.

Written informed consent was sought from all participants. Where participants were not literate, an informed consent sheet was read aloud with a literate witness present—the witness signed the form and the participant provided a thumbprint.

Results

Implementation Scores

Village implementation scores for each of the four villages were calculated (Table 4.3). Total scores ranged from 68 to 96 out of the possible 100. Three components explained much of the observed difference in scores: fidelity, completeness, and reach.

Table 4.3 Overall ranking of villages based on implementation scores

Village	Fidelity	Comp-leteness	Expo-sure	Reach	Satis-faction	Recruit-ment	Total
A	37/41	12/12	6/6	12/12	16/16	13/13	96/100
B	33/41	12/12	6/6	9/12	16/16	12/13	88/100
C	29/41	10/12	6/6	8/12	16/16	10/13	79/100
D	21/41	9/12	6/6	7/12	13/16	12/13	68/100

Scores for fidelity—the extent to which the intervention was implemented as planned—ranged from 37/41 for the highest performing village to 21/41 for the lowest performing village. Because quality improvement methods rely on insights from the ground-up, it was important that volunteers themselves generated the change ideas, and that volunteers felt a sense of responsibility and ownership for the intervention, which were features contributing most to differences in fidelity scores across villages. In the top-performing village, volunteers were very confident that they were responsible for developing and implementing change ideas, and felt that it was critical that they—rather than individuals from outside their village—were responsible for the quality improvement work. Conversely, in the lowest performing village, these volunteers regularly described their work as doing assigned tasks, and although early on in the intervention they reported being responsible for developing change ideas, later on they felt that the work had become more prescriptive. As such, volunteer ownership of the intervention, that is, feeling a sense of responsibility and influence over both processes and outcomes,(42) seemed to resonate among those in high-performing villages, but to a lesser extent among volunteers in low-performing villages.

Scores for measures of completeness and reach also exposed differences between the villages, with the highest performing village scoring 12/12 for both completeness and reach, with the lowest performing village scoring 9/12 and 7/12 respectively. Much of

the difference in reach was because of different percentages of health facility delivery and birth preparedness in each village, which were the key intermediate outcomes of the intervention. According to volunteer-collected data, more than 90% of women who had interacted with volunteers in the highest performing village were preparing delivery items and were going to a health facility for childbirth, compared to only around 60% of women in the lowest performing village.

Context

Context can affect how an intervention itself might be implemented, and also affect the outcomes that the intervention targets.(43) According to contextual factors alone (Table 4.2), it was hypothesised that Village A would perform at the highest level and Village D at the lowest, which was what we found. However, there appeared to be no difference in the expected overall influence of context on EQUIP implementation in Villages B and C, where, by scoring the process evaluation framework, differences in implementation were observed.

Identified Facilitators and Barriers

The three most important facilitators of community-level quality improvement that implementation scores helped to uncover were: 1. support from village leaders; 2. volunteers being motivated by improvements highlighted through routinely collected data; and 3. regular provision of education, leading to acquisition of knowledge and skills among volunteers.

Support from village leaders

In the top two ranked villages, the village leaders occasionally attended learning sessions and monthly meetings with volunteers; they followed-up the volunteers' work, for example, by visiting households where pregnant women were said to have been given education; and they regularly asked for reports from the volunteers and reviewed their monthly data with them. Through the in-depth interviews, it was clear that the reinforcement of their roles by village leaders contributed to the volunteers in the two top ranked villages conducting their work so consistently and effectively. As such, their scores for fidelity and completeness ended up being markedly higher than the bottom ranked villages.

"Because the volunteers do visit pregnant women at home, the ones who haven't done preparation, I get the report so I go to visit her and I tell her to prepare things. Then I go to her husband and I explain the plan. I tell him the expecting dates and that you have to have this and this." (Village Executive Officer)

Additionally, in these top two ranked villages, we learned that the village leaders had mobilised local resources to pay the volunteers a small incentive. That the village leaders took it on their community to incentivise their EQUIP volunteers showed a very high level of receptiveness to the EQUIP intervention.

"First of all, to motivate these volunteers, I have decided to give them allowances every year…we give them an allowance of 50 000 [Tanzanian shillings, ~32 USD], and each one will get 25 000 [Tanzanian shillings, ~16 USD]." (Village Executive Officer)

Volunteers were provided with a small transportation allowance to attend learning sessions and meetings from EQUIP. However, volunteers in the bottom two ranked villages were not receiving an *additional* allowance from their village. They were not receiving much local support in general, and as such, these villages also scored very low for local resources being mobilised for EQUIP activities. In-depth interviews with volunteers in these lower-performing villages highlighted that they were demotivated because they felt their work was not sufficiently recognised. It is important to note that in these villages, data was used to a limited extent, intermediate outcomes were not being achieved well, and volunteers were less inclined to see the benefit that the intervention could potentially bring to their village. As such, personal incentives became more important motivators in these villages than elsewhere, and as they were not receiving as many personal incentives—and were aware that other volunteers were—the lack of a local allowance became a barrier.

"A person sees it is better to stay and sell buns and cashew nuts than to visit a pregnant woman in this project; the issue of allowance needs emphasis." (Volunteer)

Furthermore, there were also issues around transportation. In the second-ranked village, the village executive officer recognised that the volunteers would benefit from access to a bicycle, which volunteers here were able to use to carry out their EQUIP activities.

"We gave bicycles [to the EQUIP volunteers], which we bought for the village development." (Village Executive Officer)

In-depth interviews with volunteers in the lowest performing village helped to reveal that this community was too large of an area to carry out EQUIP activities without assistance in transport. Here, volunteers did not receive any kind of local support to assist them with transportation, as such, many pregnant women did not receive a household educational visit as per the change ideas volunteers had created in this village.

"You can just walk to the households, but you might visit [pregnant women] and they are not around; I might go and not find her. So I go down again to the end of the village to find her, but I might not succeed. But with a bicycle, it isn't a lie, it can make us more successful and [our work] becomes easier." (Volunteer)

Volunteer motivation through local data
Another key facilitator observed in villages with high implementation scores was that the volunteers were highly motivated by using their own data to track improvements in their communities that they had helped to facilitate through their own change ideas. Implementation scores highlighted where volunteers were regularly using and applying local data. In the villages where data were not consistently collected and used, volunteers did not express as much of an interest in improving outcomes when they could not visualise the impact that they had on them. Process data indicated that more women in the top two ranked communities were delivering in health facilities and making birth preparations, and data from in-depth interviews confirmed that volunteers were highly motivated by observing improvements indicated by their data.

"We know that it is volunteering work, but the situation is tight. I am not ready to leave it, but if you find others, they tell you the work has no success. But me and my fellow, we are ready to do this work because it is successful and the results are positive; the community has been educated." (Volunteer)

Education
Finally, another key facilitator was the provision of education. In the villages where volunteers reported developing their skills and knowledge levels—which were also

assessed during in-depth interviews where volunteers were asked to describe PDSA cycles or to draw mock graphs of their data, for example—these villages generally scored higher in terms of implementation overall. Findings from in-depth interviews suggest that volunteers felt that by being given education, it was their responsibility to pass it on to others. Volunteers and extension workers noted that they helped to educate people in their communities and were happy to see that community members were applying this knowledge.

"Education…I like it because it is being improved often; we are being updated so that we can educate community members." (Volunteer)

"*The community receives the project positively—mostly pregnant women and their partners. Is it quite different than the situation before the project started its activities. The education they acquired is used effectively. The issue of early delivery preparations was very difficult for many pregnant women; they used to think that it benefits other people like the doctor—they didn't know that it is for their own benefit. But we have seen a lot of changes, we don't have any problem reminding them about the same issue of delivering at health facilities; they have a greater understanding now." (Extension worker)*

Discussion

Using an adapted approach to process evaluation within quality improvement that incorporated the use of implementation scores, we have highlighted the extent to which process components (fidelity, completeness, exposure, reach, satisfaction, and recruitment) were carried out in the EQUIP intervention as planned. We identified key facilitators and barriers of community-level quality improvement. Finally, we assessed contextual factors that might have affected implementation.

Commonly, qualitative data from interviews or focus group discussions are used to uncover facilitators and barriers of an intervention.(44-46) When evaluating similar interventions, systematic literature reviews and meta-analysis are also used to deduce facilitators and barriers of these as a whole.(47-49) However, as there are very few examples of community-level quality improvement, relying on secondary data from systematic reviews was not an option. There were advantages to using a process evaluation with implementation scores to unpack facilitators and barriers of the EQUIP intervention at the community-level. First, the process evaluation relied on multiple sources of data including quantitative process data, qualitative data (from in-depth interviews, focus group discussions, key informant interviews, and birth narratives), contextual data, and others. These data were triangulated to uncover facilitators and barriers in a more methodologically rigorous way than could be achieved through qualitative methods alone, which often focus on *perceived* facilitators and barriers, thus increasing the trustworthiness of our results. Second, using implementation scores allowed for a more objective measure of performance of each of the four sampled villages within the EQUIP intervention, and as such, enabled us to investigate which factors were present in higher performing villages (facilitators) and which were present in lower performing villages (barriers).

Assessing facilitators and barriers within community-level quality improvement was done with the intention of informing forthcoming interventions. The results from our process evaluation can be viewed as important formative evidence that might guide the design of future community-based quality improvement interventions. Our results indicate that village leaders should be included as implementers of similar interventions alongside volunteers, as their role as facilitators of EQUIP was invaluable. Furthermore, volunteers should be continuously encouraged to collect and utilise data around their

change ideas, not only so that they can modify change ideas that do not appear to be working, but also because physically seeing improvement was a potent motivator of their work. Finally, providing ongoing and regular education around quality improvement and maternal and newborn health to quality improvement teams should be upheld. Provision of bicycles and more generous allowances to volunteers might also be important considerations, which villages might be able to provide directly, rather than external funders.

Process evaluations have been used to evaluate the implementation of other community-based interventions, including within maternal and newborn health.(50-52) However, there is still a notable gap in the literature around complex behaviour change interventions like EQUIP, with many interventions reporting only on impact and not on process.(53-55) As such, there is under-reporting of process data, despite its potential to provide valuable implementation insights. Furthermore, as much of the literature around process evaluations within quality improvement interventions comes from the health facility level in high-income countries, their emphasis tends to be around organisational culture and technical capacities.(56) These methods fail to capture what is important or even relevant at the community level. Therefore, this article does not only provide a description of an alternate methodology for process evaluation for quality improvement and/or community-based interventions, but also reports process data to contribute to the small evidence base that currently exists.

Limitations

A key limitation of the use of a process evaluation using implementation scores was the lack of rigorous measures of reliability. Measures of internal consistency such as Cronbach's alpha were not appropriate measures of reliability given this type of evaluation, where each section of the process evaluation measured a different construct.(57) Rather, we provided a measure of inter-rater reliability. Supervisors of village volunteers, the overall district mentor, and EQUIP staff were asked to rank the villages according to their performance, and all agreed on the highest performing village (Village A) and the lowest performing village (Village D), with the suggestion that the other two villages (Villages B and C) would then fall in either position with intermediate rankings. These rankings were consistent with the implementation scores. An additional limitation was that a small number of villages were researched, meaning that the study does not give a complete picture of the potential utility of the methods

applied. This type of intensive evaluation might also be restrictive in other settings or within other interventions. Additionally, data were collected throughout the second year of implementation and it is possible that different results might have been obtained with different timing.

Conclusion

Overall, the use of a mixed methods process evaluation that was analysed with implementation scores was a helpful way of explicitly drawing out higher and lower performing villages, and may be replicated elsewhere. This method increased the ease with which facilitators and barriers of community-level quality improvement could be uncovered. The results can feed into the formative stages of similar interventions in the future.

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Chapter 5

Results Chapter: Community Participation within Community-Level Quality Improvement

This chapter describes the extent to which factors influencing community participation-based interventions (knowledge and skill transfer to community members, local leadership, local management, local needs assessment, local design and implementation, local monitoring and evaluation, and local ownership) also influenced the community-level quality improvement processes of EQUIP. This chapter then explores additional enabling factors within community-based interventions such as community acceptance and receptiveness to the intervention, volunteer receptiveness to the intervention, and empowerment. Perceptions around volunteerism within the context of this intervention are briefly introduced. Following Chapter 3, this chapter provides further reflections on a few ethical concerns arising within community-led interventions. The chapter concludes with a conceptual framework for how these factors influencing community participation affect the implementation of community-level quality improvement, produced through constructivist grounded theory.

Introduction

Everything from needs assessment and implementation to monitoring and evaluation is led by the stakeholders engaged in the quality improvement work. EQUIP was unique in its engagement of community members in quality improvement. Village volunteers were expected to drive the intervention in their respective villages and to assume leadership and responsibility for its activities and outcomes. We expected a community-led intervention with a high degree of local ownership. As indicated in Chapter 2, there are a number of factors influencing community participation, some of which are used as proxy measures of community participation within health interventions. These include: building knowledge and skills among community members; local needs assessment; local leadership; local management; local project design and implementation; local resource mobilisation; local monitoring and evalaution; and local ownership. These factors were all embedded within the process evaluation framework described in chapters 2 and 4, concentrated largely in fidelity. Overall, as quality improvement is so participatory, we expected that these factors would also be present and would influence the implementation of the EQUIP intervention at the community level (Table 5.1).

Table 5.1 Eight factors influencing community participation, assuming a high level of participation within a health intervention

Factor	Influence of factor within an intervention with a high level of community participation
1. Knowledge and/or skill transfer to community members (1, 2)	Participants learn from each other or from external sources. The knowledge and/or skills acquired are then transferred to other areas in which they may be relevant
2. Local needs assessment (3, 4)	Self-planning by community members as they define the problem and decide the action
3. Local leadership (1-5)	Local leaders represent the diverse needs of the community and have ownership of community health activities
4. Local management (3-6)	Oversight of activities provided by community-based leaders
5. Local project design and implementation (5,	Community members incorporate or create mechanisms for introducing health activities

7, 8)	
6. Local resource mobilisation (3, 5, 6)	Resources contributed by community and resource allocation is by community members
7. Local monitoring and evaluation (4, 6)	Program monitoring and evaluation done in a participatory way, with community members directly responsible for monitoring and reporting
8. Local ownership (1, 2)	The community takes ownership of the intervention and sees it as something that they are responsible for and are able to influence its processes and outcomes

Unsurprisingly, some of these factors were key facilitators of the intervention, as highlighted in Chapter 4. For example, the inclusion of local leaders and reinforcement of local leadership and management were critical to the intervention's successful implementation. Likewise, the knowledge and skills that volunteers gained were critical motivators of their work, and were thus facilitators of the intervention. Local monitoring and evaluation, especially when it enabled volunteers to tangibly recognise their contributions to improvements in their communities, was also an important facilitator of the intervention. Finally, where volunteers had a strong sense of ownership and genuinely felt responsible for the intervention and capable of influencing its processes and outcomes, they tended to perform better. It was these factors influencing community participation that differed to the greatest extent between the high- and low-performing villages.

With the view that the factors indicated in Table 5.1 are essential components of the EQUIP intervention design, and thus probable facilitators of the intervention, the results that follow describe these factors within the context of community-level quality improvement. Following these results, several other factors influencing community participation that emerged throughout this quality improvement intervention are presented. A conceptual framework outlining how all of these factors came together to influence the implementation of community-level quality improvement is shared.

Eight Factors Influencing Community Participation within EQUIP's Community-Level Quality Improvement

Knowledge and/or skill transfer among community members

Volunteers and extension workers unanimously agreed that they had gained a new set of knowledge and skills through their participation in EQUIP. Some volunteers had some pre-existing knowledge about maternal and/or newborn health from their involvement in other community-based interventions. However, even the most knowledgeable of volunteers reported gaining new knowledge and skills, particularly around maternal and newborn danger signs and infection prevention and control during childbirth and the post-partum period.

"I had no knowledge of reproductive health issues, but I have learned and educated community members in my village that they should go deliver in health facilities, so that if anything happens they can detect it quickly and not at home because they may get problems during delivery." (Female volunteer, 20)

None of the volunteers or extension workers had any prior knowledge of quality improvement. Although extension workers were more familiar with setting numerators and denominators linked to program objectives and calculating percentages, none of the volunteers had ever had the responsibility of collecting, analysing, and using local data. As such, quality improvement-specific skills such as the use of PDSA cycles and plotting of data on annotated run charts to monitor improvements were entirely new skill sets that volunteers and extension workers had gained.

"I can do it … I draw a graph, for example, in May I may get twenty percent so I put twenty percent or if I got seventy percent, I put seventy percent. I draw the graph, then you check whether the graph rises or falls. If it rises then one continues with the same change idea, while if graph falls one has to look for another change idea." (Male volunteer, 52)

Calculating percentages seemed to pose the most trouble for volunteers, and they readily worked with each other to ensure that it was done correctly.

"Us volunteers, we have different levels of education, some are standard seven, some have secondary school, but all of them are in each village … You may be fast in capturing things, but you do not know how to calculate the percentages, it means I will need support from my colleagues to teach me." (Male volunteer, focus group discussion)

Furthermore, volunteers reported that they developed skills as they carried out their changes ideas, for example, being able to effectively educate women or other members of a household about any of their topics of focus.

"One of the skills I learned is about educating women and to know the problems that pregnant women face. Also, I was very fearful to enter people's houses to talk with them, but after being trained, I can enter any house and I introduce myself." (Male volunteer, 45)

Volunteers were all asked about how they make and plot calculations and to explain what was meant by "PDSA cycles" and to indicate how they use them.

"How we choose [a change idea]? We plan [said while pointing to "Plan"], then later we implement [said while pointing to "Do"]. After that we look and learn, has the change idea that we targeted reached a good point? [Said while pointing to "Study"] If it is successful, we leave it with its success. If there is no success, we take the measure of preparing other change ideas that will bring success [Said while pointing to "Act"]." (Male volunteer, 52)

All volunteers had a very good understanding of PDSA cycles and how they were applied to their quality improvement work, with the exception of one volunteer who had replaced a dropout only two months prior to her interview. Views expressed by volunteers in earlier data collection, however, emphasised the initial difficulties volunteers experienced with the quality improvement methodologies. As indicated in Chapter 3, building this knowledge and skill base was time consuming and relied heavily on regular mentoring and coaching.

"In the beginning it was very difficult to fill in the information. We were just filling the name of the mother and the date of delivery, this time we were called at [a monthly

cluster meeting], we were educated on how to fill in the information, how you put it in the graph … First we visit the mother, we talk to her about safe delivery, and we educate her. After some days you visit her again … Did she give birth at the dispensary? Did she fulfil the things [for birth]? Does she know the danger signs? So you get to know this mother has a certain percentage on all the things that she has been able to respond." (Female volunteer, 34)

Volunteers and extension workers identified themselves as being knowledgeable and having adequate skills in quality improvement in order to lead the intervention in their communities effectively. Extension workers also mentioned developing skills in managing and supporting volunteers.

"I also acquired knowledge on the strategies used to communicate with people—the way we can get time to meet with other stakeholders in exchanging ideas, discussing various challenges, and how to solve these challenges." (Female extension worker)

Volunteers also expressed that what they had learned would apply to their own lives, both with regards to their increased knowledge around maternal and newborn health, and to the quality improvement skills that they had obtained.

"I value being a volunteer because initially, I didn't know and have the heart that, when my wife is having labour pains, then I should rush her to the health facility. I used to say that she will deliver at home since she had delivered four children safely at home. So I value this." (Male volunteer, focus group discussion)

Finally, many volunteers expressed that by very nature of having developed a new knowledge and skill set that could benefit others, they felt the responsibility to pass it on. As indicated in Chapter 4, this education was an important motivator among volunteers, and seeing themselves as resource persons in their community was part of what motivated their activity within EQUIP.

"I am motivated to help pregnant women in my society … I want to save pregnant women's lives by giving them knowledge. I have the knowledge, so I cannot stay with it at home…when I see pregnant mothers facing problems, I feel touched, really, so to

stay at home with my knowledge while others suffer doesn't come to my mind." (Female volunteer, 20)

Local leadership

Many volunteers felt they were leading the EQUIP intervention in their communities. Volunteers also saw this role as something that increased their status in their communities. As such, building and maintaining relationships with community members was seen as important.

"First of all I like to educate and protect mothers' health by telling them to avoid home deliveries in places that do not have professionals. Also, by doing that I will be building respect and closeness among myself and the families." (Male volunteer, 45)

Many volunteers felt that, because of their role in EQUIP, they now had insider knowledge about the health of women and newborns in their communities. Because of this new role, they also felt it increased their recognition, not only in their communities, but at local health facilities, which instilled in them a sense of leadership.

"It gives me leadership in my community because now I have been told that, after every month end, I have to go to the hospital to see a nurse to collect death and birth statistics for the mothers who delivered and the newborns. So if I did not join the EQUIP project, I could not know how many mothers and children have died and how they have occurred, how many children and mothers have lost their lives, or how many pregnant women have given birth. I get to know a lot of things because I am in this project, and when I pass over there, I am well known as a volunteer." (Male volunteer, focus group discussion)

Being from the community also afforded the volunteers with a greater sense of empathy and responsibility for the work that they were doing. The majority of volunteers indicated that the overall health and development of their communities was hugely important, and saw their role in EQUIP as contributing to these.

"I like my community to be in a good place so that they can keep on rolling their development wheel. The other reason is so that the community can improve their health." (Male volunteer, 25)

Local management

The extension workers who supervised the volunteers were also members of the same or nearby communities. They were government employees who regularly worked at the community level, which gave them familiarity with the local context, as well as with local leaders. As supervisors, this insight helped them to direct volunteers more effectively. Moreover, from a logistical perspective, the extension workers often lived and worked in relatively close proximity to the volunteers whom they oversaw, and as such, they were close at hand to support them as needed.

"[The extension worker] is not short tempered and gives me a chance to go and ask certain things in his office in case I am confused, and he helps me to understand them. Also sometimes he visits me at home. He may ask what is happening in my area and what activities have I done and asks if I have any problems." (Male volunteer, 45)

Volunteers expressed sincere appreciation and respect for their extension workers, noting that they had gone above and beyond what might be expected of them to foster good working relationships. Extension workers also acknowledged that there were very good working relationships within EQUIP.

"R1: [Our extension worker] is so good. R2: We accept her so much. That woman, first, she is committed. She doesn't have discrimination. We help each other, she visits each volunteer… R1: Sometimes if you tell her you have lost someone, she attends the funeral. If a person is sick she visits her. I was sick for the whole month and she was coming to visit me every week." (Multiple respondents, volunteers, focus group discussion)

A lot of the supervision that was done occurred through monthly meetings between learning sessions. The meetings were typically run collaboratively, and volunteers were given a platform to learn from one another, not unlike in learning sessions. Therefore, beyond extension workers, volunteers would also regularly turn to each other for support, mentoring, and coaching, both at monthly meetings and at learning sessions. They often exchanged best practices around change ideas, offered suggestions to each other to help overcome challenges, and supported each other in calculating and plotting data.

"We teach each other. If someone has not understood well on the way to make records, even our [extension workers] helps us on that, so someone may understand where he has filled it in badly or forgotten and corrects it with his colleagues." (Male volunteer, 25)

A district mentor—from Tandahimba—supervised extension workers (Chapter 3). He met with all extension workers each month to provide follow-up education as needed, and to give them an opportunity to learn from each other, much like as volunteers did during monthly meetings and learning sessions. Having an approach that was not overly prescriptive seemed to resonate with the extension workers and made them feel valued.

"I am happy about EQUIP because one's contribution is valued…I am satisfied because it is not a top-down approach, because when they come they want to know how I succeed in my activities, thus they also learn from me." (Male extension worker)

Local needs assessment

In Chapter 6, the barriers to care-seeking or making birth preparations as identified by women and men in communities are indicated. As volunteers are community members, it would be expected that their understanding of these barriers—and their subsequent reflection in change ideas—would be similar. In many instances, this was the case. For example, volunteers recognised financial barriers in their communities and created emergency transport funds to address this problem (see local resource mobilisation below). Volunteers—like recently delivered women and their partners—also stated that the involvement of men was of critical importance if women were to make birth preparations and get to health facilities for delivery in particular. As such, the inclusion of men was emphasised by volunteers in all four villages included in the process evaluation (see Chapter 3).

Volunteers recognised that their local insights made them well-suited to identify context specific problems that they could then develop change ideas around.

"We choose the change idea that will succeed depending on our environment where we live." (Male volunteer, 20)

Local project design and implementation

Project design is the creation of change ideas, and implementation is the carrying out of these. Volunteers recognised that the design of change ideas was within their jurisdiction and indicated it was often a collaborative process, either with other volunteers at learning sessions or monthly meetings, or with their village leaders. Volunteers unanimously felt responsible for the implementation of change ideas.

"When we meet we ask each other, 'when you go to the community how do you explain yourself and what problems do you face and how you overcome them?' Then we discuss whatever we have discussed and come up with a change idea that we think can work. We also exchange change ideas that will be good to all of us." (Male volunteer, focus group discussion)

Throughout, extension workers generally realised that they were not primary creators or implementers of change ideas, but problem-solvers and facilitators, acting as liaisons between volunteers and EQUIP as a whole.

"[My role is] to cooperate with EQUIP implementers from the village level who are the volunteers ... Also, I am the link between volunteers in villages to the district level. I collect reports, and conduct meetings to solve EQUIP challenges, which have been collected through the data from the village level to the district, so as to create improved change ideas. Therefore, that is my other role." (Male extension worker)

Local resource mobilisation

The majority of change ideas required only the provision of education or mobilising the few resources that were provided by EQUIP. However, in some villages, leaders mobilised village resources in order to provide an allowance for volunteers (see Chapter 4). This allowance was typically from the village's funds derived from taxing cashew sales. Provision of bicycles to EQUIP volunteers also took place in one village (Chapter 4).

Finally, in one of the sampled villages, a new change idea that volunteers were in the process of testing at the time of data collection was the introduction of an emergency transport fund. This fund would require the active support of community members.

"The objective of the emergency fund is when we see a community member has problems … the fund will be started if the community members agree, so when a mother has a problem, she is given the money for transport so that she can go to the hospital early without caring where the husband or relative is, so when he comes back he will be told, 'your wife has been taken to the hospital early', that is our objective." (Male volunteer, 52)

Local monitoring and evaluation

A key component of quality improvement is the ongoing monitoring and evaluation of change ideas, first when they are tested on a small scale to ensure that improvements are being made, and second to routinely evaluate the success of scaled up change ideas. As such, volunteers were aware that monitoring and evaluation of their change ideas was a critical part of the quality improvement methodology that they had been taught. The importance of doing monitoring and evaluation was noted not only by volunteers, but by the extension workers, the district mentor, and EQUIP staff.

"Volunteers, they are the primary sources of data. They are the ones who are living…within the communities where we are working. It's the first individual who is there to produce data. Very meaningful data. We cannot work within EQUIP without volunteers." (District Mentor)

Volunteers were able to describe how they routinely did monitoring and evaluation. Very often they made the link between what their data was suggesting and the subsequent action they would need to take, regarding changing or scaling up their change ideas.

"We plan [a change idea], then later we implement it. After that we look and learn: has the change idea that we targeted reached a good point? If it is successful, we leave it with its success. If there is no success, we take the measure of preparing other change ideas that will bring success." (Male volunteer, 52)

As indicated in chapters 3 and 4, volunteers frequently cited the importance of collecting data to their work, and saw it as novel. However, a less expressed opinion

was that some volunteers faced difficulty in collating data and generating run charts, and this was a source of frustration and disengagement with the intervention.

"[Interviewer: What do you like least about EQUIP?] Delivering reports. [Interviewer: Why?] It is difficult in compiling it…to write a report and all those explanations. [EQUIP staff] should put effort in the training…they should educate us more." (Female volunteer, 50)

Local ownership

Although there are multiple ways to define ownership, here we borrow community participation in development, in which ownership is thought of as a sense of ownership in process (having a voice and being heard), a sense of ownership in outcome (being able to influence decisions and what results from them), and a sense of ownership distribution (who is affected by process and outcome). (9)

Focussing on the first two aspects of ownership, volunteers expressed the collaborative nature through which ideas, challenges, and best practices are shared, in which all opinions are valued.

"Each of us contributes in saying whatever you feel from your heart. We then collect all opinions and based on them, we come with a good recommended change idea to be used, that's how it is. We agree that we will use this idea, what remains is for us to implement the idea." (Female volunteer, 20)

"The learning session is two-way traffic, it is not one-way. [Volunteers] have knowledge on their community. They have something which they understand. They are, what do you call? A flame to ignite." (District Mentor)

Furthermore, volunteers within the EQUIP intervention felt that they influenced the processes within EQUIP, as evidenced through their expressions of responsibility for various aspects of intervention, including identifying the needs in their community, developing and implementing change ideas to address these, and monitoring and evaluating change ideas to ensure their ongoing success. Volunteers indicated that, through the training they had received, and by very nature of them being identified as a

volunteer, that instilled in them a sense of responsibility for the intervention and its processes.

"I see myself having authority…but I consider my ability to give out education which I was trained on. I see that I am having authority. That part makes me feel and become trusted to direct the [targeted groups] on these issues." (Male volunteer, 52)

Regarding influence over decision-making and the outcomes that arise from these, volunteers widely perceived that their work within EQUIP was contributing to improved maternal and newborn health outcomes and often cited the decreased deaths that they had noticed in their communities as a result of their work. Seeing positive data suggesting that their change ideas were working further contributed to this sense of ownership over outcomes, especially those perceived to be positive.

"We also thank this project, because ever since it started there's reduced maternal deaths and newborn deaths, but all those are due to sensitisation, because initially, the majority of women were delivering from home, but now after educating them, they deliver from hospitals. Therefore, now there is more safety for mothers and newborns, but all this is due to EQUIP." (Female volunteer, focus group discussion)

On the final point regarding ownership distribution, again volunteers saw themselves in a position of influence, not only for immediate outcomes, but for the longer-standing effects that the intervention would have, largely related to the overall development of their communities and the country of Tanzania as a whole. Extension workers also echoed this sentiment.

"What motivates me is that what is being done is not for the person's benefit, but rather a nation's benefit, and that the people we are helping are our relatives. The goal of reducing maternal death also motivates me, so the morale is within me, in my blood, because what we are doing is also a benefit to future generations." (Female extension worker)

Receptiveness, Satisfaction, and Empowerment as Cross-Cutting Enablers of Community-Level Quality Improvement

In addition to the eight factors described above, three other aspects of community participation were uncovered: community receptiveness to and satisfaction with the EQUIP intervention; volunteer receptiveness to and satisfaction with the EQUIP intervention; and empowerment.

Intervention target (mother's and father's) receptiveness to and satisfaction with the EQUIP intervention

One of the reasons prompting community-based interventions is the anticipated acceptance of local volunteers by community members, and subsequently, greater uptake of whatever intervention they are a part of.(2, 10) Volunteers readily acknowledged that their communities accepted and appreciated them, and therefore, the messages they brought.

"Living in the village, you need wisdom and respect because you need to educate women. If you respect others you will also be respected." (Male volunteer, 20)

"Someone may work well after having experience in an environment—the way the community lives, knowing each other and the attractiveness of being accepted by your own people. It is possible that someone else may come to this community from another community and wants to be a volunteer, but acceptance may be a problem, or [the community] may respond slowly." (Male volunteer, 45)

Being actively sought out by pregnant women in their communities for education was something that volunteers reported across villages in in-depth interviews and focus group discussions. Village executive officers also acknowledged this practice.

"If the pregnant woman is sick, people do seek advice from those volunteers." (Village Executive Officer)

The subject matter of EQUIP—maternal and newborn health—resonated with community members. Households were generally happy to accept an intervention that they felt would bring improved health outcomes to mothers and newborns. Women readily cited that they valued education about danger signs and specific items to prepare

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for birth, which they may not have been aware of previously. Women who directly benefitted from the education received, for example, by being sufficiently prepared for birth and avoiding problems during delivery as a result, were particularly satisfied with the intervention.

"We are empowered with important knowledge, like knowing mother and newborn danger signs, also when those signs happen, we should go to health centres and not to local healers." (Mother, 29)

"I am satisfied with it because they have educated me and I have been able to go and give birth safely and until now I am in good health together with my child … If you follow their advice, all the equipment that you carry is used for your own benefit. I liked that because I stayed at the hospital for more than a week, I was at the hospital, so I was not worried. I had carried enough." (Mother, 39)

However, a barrier for some volunteers—younger males in particular—was gaining access to households for educational home visits (if it was their change idea) owing to their age or to distrusting husbands. Village leaders played an important role in sensitising particularly resistant households.

"I had visited a pregnant women, and gave her knowledge about safe delivery, and her husband…told me specifically, 'I don't want you to come to my home, and if you come I will cut you with a machete'. Despite that, I was not tired, I tried to give education and I also gave feedback to the village government that I went to a certain house and the husband told me that he will cut me with a machete. The village executive officer summoned the husband and gave him education, and when I went back to that house again, it was simple." (Male volunteer, focus group discussion)

"Some women hesitate and they don't believe the education I give them; they are taking me as a small child who cannot teach them those things as they have been [having children] for so long, even before I was born." (Male volunteer, 25)

Further to this point, having at least one female volunteer in each village was perceived as necessary, as, culturally, women might hesitate to engage with a male volunteer.

"[Women] feel ashamed to talk to men… In our culture, women feel very shy to talk to men. But if there is a woman there, they feel free to talk to her." (EQUIP district mentor)

However, (see Chapter 3), the engagement of men within pregnancy and childbirth was an important focus of many volunteers that contributed to already positively changing social norms. Again, village leaders helped to sensitise villages to the work of volunteers and provided opportunities for volunteers to speak to the village as a whole.

"In the village meeting I can stand and talk and the village executive officer can put an emphasis [on what I say] … If [the village executive officer] opens the meeting he talks about what he wants to talk about, then [he] stands and says, 'there is a certain sister who wants to talk about a certain matter'. So when the time comes I am allowed to stand, then I insist that he [emphasises what I have said]." (Female volunteer, 34)

Finally, as community members themselves, male volunteers within EQUIP also reported gaining important insights around pregnancy and childbirth that they did not previously have (see *Knowledge and/or skill transfer among community members*).

Another barrier linked to community acceptance was the misconception by community members that volunteers were being paid or that they should have provided households with items needed for birth preparations. Again, involvement of village leaders to help sensitise households seemed to mitigate these concerns.

"Initially we didn't even know what EQUIP was, but now people know, whereby if a volunteer reaches there and is asked by the people, where is this project from? You say proudly that I am from Ifakara [all laughing], because now the whole community is educated and we don't get any disturbance when we go to visit them, and that's why we feel happy. Initially we were getting disturbances because people didn't know what it is, but now it's really nice." (Female volunteer, focus group discussion)

Implementer (volunteer) satisfaction with the intervention
Volunteers all enthusiastically expressed that they were glad to be a part of the intervention. Their satisfaction stemmed largely from the perception that they were playing an important role in their communities and truly helping to improve the health

of mothers and newborns. As such, the participatory nature of the EQUIP intervention and the sense among volunteers that their work was contributing to improved health outcomes (as also indicated in *Ownership* above), was an important part of their satisfaction and sustained involvement in the intervention.

"This work is important to us. First, it gives us awareness and gives us benefits, it also helps to decrease maternal and newborn deaths, which was very problematic for us, but right now it declines. Things are going well because you can visit [a health facility] and be advised that this month nobody died due to maternal [causes]...long back we had those problems, but now we are doing well, therefore we must see it as important to us." (Female volunteer, focus group discussion)

The second reason for volunteer satisfaction was due to the recognition of benefits to themselves, and increased status in their community.

"It is also an advantage to have certain knowledge. By volunteering you possess a sort of awareness as a volunteer compared to somebody who doesn't know anything." (Male volunteer, 52)

To contribute to satisfaction, incentives within community-based interventions are complex. Volunteers were aware of the incentives that volunteers from *other* community-based organisations received. For example, one organisation supplied their volunteers with t-shirts, rain boots, and bicycles to assist their transportation, all of which EQUIP volunteers felt they should be receiving. The only material incentive given to volunteers was a sitting allowance of 5000 TSh (~3 USD) to attend monthly cluster meetings, and 25 000 TSh (~16 USD) to attend quarterly learning sessions. Most volunteers felt this this amount was simply too small to be of significance and did not indicate being incentivised by the allowance.

"We have decided to volunteer by ourselves, at least the five thousand shillings should be raised; at least you will have to say, this should be increased so as to satisfy the volunteers who are working." (Male volunteer, focus group discussion)

However, despite feeling that the allowance should be increased, volunteers did often stress that their real motivation and satisfaction within the intervention came from their sense of helping their community.

"I go to educate the community. This keeps me motivated more than allowance. Allowance is just like an extra thing, but I want to serve my community…I am patriotic. I want my community to resemble other advanced communities with good health like the developed world." (Male volunteer, 45)

However, in some instances, there was the impression that volunteers were acting opportunistically, showing up to meetings or learning sessions when they knew an allowance would be provided, and otherwise failing to do any activity in the village. In Village C, such was exactly the case, and the initial volunteer—a male aged 21—was replaced because he was inactive.

"Before me there was my colleague who used to do this task. He was lazy and he was not doing follow-up, hence he was removed and I was given a chance." (Male volunteer, 25)

Empowerment

Empowerment suggests that people participate in, negotiate with, influence, control, and hold accountable institutions that affect their lives.(11) Within the context of EQUIP, quality improvement was carried out simultaneously at the district, health facility, and community levels, with considerable opportunities for exchange, particularly between community members and health facility staff engaged in quality improvement. As such, a platform for volunteers to liaise between their communities and health facilities was presented. That is, there was a potential opportunity for community members—the village volunteers—to engage with a key institution—health facilities—that impacts health outcomes for their communities.

"Through the cooperation that I am talking about [between health facility staff and volunteers] there are plenty of successes because of the opportunity to learn inside, from the community, as well as from the facility. They have been collecting data and also they do evaluations to find out which facility submits reports, and also which community brings information. Therefore, we discuss and identify challenges, and then

we set strategies that will bring success." (Female extension worker)

There was the perception that cooperation between health facilities and volunteers was taking place, largely with regards to quality improvement team members at each level being aware of each other's change ideas and objectives. As indicated in Chapter 3, health facility staff and volunteers did help each other through: reinforcement of messaging, especially around birth preparedness and health facility delivery; the inclusion of men by insisting that husbands attend antenatal care and are tested for HIV; and upholding fines, in which health facility staff would refuse to give the baby a registration card or provide immunisations for a baby delivered at home until the mother or father paid a fine to the village executive officer.

"To me, I see [collaboration between health facilities and volunteers] has increased because in the beginning, we were not used to sitting together [in monthly meetings]. Thereafter they decided to join us during the meetings in order to know us—who are we. It was difficult in the beginning even if you could get a problem they could not know us … But nowadays, they send one staff [to monthly meetings] who came to know the village volunteers." (Male volunteer, focus group discussion)

However, beyond this cooperation, there was also the view expressed by some volunteers that they could actively speak with health facility staff to influence improvements in provider attitudes and service delivery.

"Previously, women were just left on the floor while nurses were just sitting and talking. From the meetings we have been having, us volunteers, we tell [the nurses]. We sensitise women to attend to the clinic, although women were complaining about being harassed at the facility. But nowadays, pregnant women are cared for, not like previously." (Female volunteer, focus group discussion)

"In the beginning, we were taking pregnant women [to the health facility]; they were attended to, but not so well. But now…when you take a pregnant woman, she is attended to without wasting time, when you just arrive, she is received and attended to. So I see that these things have increased because of what we [as EQUIP volunteers] do and the information that has been taken to the facility." (Male volunteer, focus group discussion)

Finally, a less common opinion was that, even with opportunities for exchange, there was still a lack of respect and collaboration between health facility staff and volunteers. It was perceived that health facility staff felt their positions are more valuable than volunteers', and thus were not open to working with volunteers or to hearing the concerns of volunteers.

"Today when we go to the health facility, they do not care we are there. We do not get priority at all, yet we are helping them to sensitise mothers in the villages, but when it comes we need help from the health workers, they see us as useless just because we are volunteers and we don't get paid a salary from the government." (Male volunteer, focus group discussion)

Overall, it appeared that the relationship between volunteers and local health facility staff varied, and in some cases, health facility staff were more engaged with volunteers and in their work than in others. Prior to EQUIP, volunteers would not likely have had many opportunities to engage with health facility staff as peers, and although still a movement in its infancy, the beginnings of a sense of empowerment was expressed.

Perceptions of Volunteerism within EQUIP

Volunteers typically did *not* end up in their role because they had expressed interest in participating in EQUIP. Rather, in almost all instances, volunteers were approached by village leaders or selected by community members to participate in EQUIP. Volunteers were asked whether or not they felt that they could openly decline to participate. Overwhelmingly, they felt that they could not decline because they felt privileged to be singled out by village leaders to participate, and felt a sense of responsibility.

"If the community has seen you capable of educating the community about something, you just have to abide by them because you are one of them and hence cannot refuse [to be a volunteer]." (Female volunteer, focus group discussion)

Volunteers seemed to consider themselves as such largely because they were doing work without pay.

"I have also agreed to be a volunteer, so payment is not a must, taking into account that we help our people in our villages or the community that surrounds us." (Female volunteer, 20)

Some of the volunteers used language that suggested they were simply being assigned to a task rather than directing their own activities. Even if they were given the responsibility of creating a change idea, for example, that was still a new responsibility ascribed to them by someone else, and regardless of whether that responsibility was valued or not, it did not manifest intrinsically from the volunteers themselves.

"EQUIP has given me this role to sensitise people to deliver in the hospital, so this is my role." (Male volunteer, 20)

"I was told that I would do the work and I agreed." (Female volunteer, 27)

Volunteers seemed to distinguish themselves from the "others" in their communities, indicating specific characteristics that they possessed that led to their selection by village leaders or community members. There were a few very prominent qualities that volunteers expressed having: a "heart" for volunteering, typically as evidenced through their history as a volunteer in their community; a sense of selflessness and investment in their community, which is of course highlighted through their willingness to work for free; being hard working and having a capacity to do volunteer work; and finally, having desirable qualities that make community members accept them, namely being perceived as knowledgeable and trustworthy by the community.

"Those who selected me obviously knew that this one has the heart of serving people and she loves to volunteer by helping to educate about the importance of health to a mother and child. Some people don't like the job of volunteering, so they refuse, but we have accepted because we know and we want to serve the community. Even our leaders know those who love to volunteer in their community." (Female volunteer, focus group discussion)

"They are already used to me, even other days when I just passed on the way…they start thinking, what else has he come to teach us? Therefore, that situation makes me

have a certain position, because they have accepted me and I can see it." (Male volunteer, 52)

Ethical Considerations Regarding Community Participation in Health Interventions

As raised briefly in Chapter 3, there are interesting and complex ethical considerations that arise within a community participation-based intervention. In this intervention, there were a few change ideas that volunteers created that spread widely between them. These included: the creation and enforcement of fines for women who gave birth at home; fines for traditional birth attendants who assisted women at home; and insistence that health facility staff deny services to women who gave birth home without explicit permission from the village executive officer—often with proof that the woman or her partner had paid a fine. As this was a community-led intervention, these change ideas were not questioned by the EQUIP team external to these communities. Some volunteers even acknowledged that the community had expressed dislike for the fines, but that they continued to implement change ideas that included fines. In one village, fines had previously been in place prior to EQUIP, but had been removed due to outcry from the community. EQUIP volunteers then re-invoked the fines, which may have been directly contrary to the interests of community members.

"Yes, previously there was a law that if a woman delivered at home, they were supposed to pay, but the village executive officer removed it; it was not good because the government set that law but it was not right, because there are even those who could deliver at home by mistake…this law was not good. But since EQUIP started, that plan is what is applied [again] now. Women, if they deliver at home, they have to be given a penalty." (Male volunteer, 20)

"We said that the one who gives birth at home should be charged a fine of ten thousand shillings [~6 USD]. It is a must for the mother to give birth at the health facility, [but community members complained, saying] 'I am the one who has given birth to the child why should I be charged the fine by the village executive officer?' That is the change idea that we have done and the community doesn't want it … If you look at my register, a large number of people have given birth at the health facility because they are

afraid…the community knows that the matter is serious, even old people, because the community is afraid of the government." (Female volunteer, 27)

As Chapter 3 highlights, women did have the opportunity to challenge their fine, and with reasonable justification, it would be waived. Of the 12 women who participated in birth narratives and in-depth interviews who had given birth at home, only one mentioned having to pay a fine, but she successfully challenged it because there were no staff present at the health facility to attend her when she was in labour.

"After giving birth at home, after being escorted to the hospital, the nurse started to complain. [Interviewer: Why did she complain?] That I am supposed to provide money. [Interviewer: You provide money?] Yes, for giving birth at home.
[Interviewer: Did you provide it?] I didn't provide it. [Interviewer: Why?] Because [the nurse] is careless. [The health facility staff] are the ones who were not around on that day. I told her that we would go anywhere; she went to the village executive officer to tell him. My husband was called. When he went he explained the situation and it was found that she was the one at fault." (Mother, 36)

The use of these fines raises important ethical questions. As has been found in other settings, women in the lowest socioeconomic bracket are more likely to give birth at home.(12-15) The overall goal of getting women to health facilities for delivery is a good one, but it is not clear whether women who are already disadvantaged are being further penalised by the use of these fines. As such—to borrow from the four principles of biomedical ethics—ethical principles such as non-maleficence and beneficence may not be upheld.(16, 17)

Although working inline with the government-mandated suggestion that no births occur at home, by effectively outlawing home births and fining mothers and/or birth attendants for home deliveries, traditional birth attendants, who were previously looked upon as playing an important role in the community, have seen their role minimised and prohibited. As such, the EQUIP intervention, alongside strong discouragement of the use of traditional practitioners by the government and other organisations, has contributed to the disempowerment of traditional birth attendants, which may not be fair or just practice from their perspective. However, in several villages, traditional birth attendants were provided with education and sensitisation by volunteers, or volunteers

worked to redefine the role of traditional birth attendants (Chapter 3). There have been successful attempts elsewhere to enlist the support of traditional birth attendants in facilitating care-seeking, particularly for high-risk pregnancies.(18-20)

"The office has to stop the traditional birth attendant by telling her, 'stop your work because it's not needed now. The pregnant mothers are supposed to give birth in the dispensary, and if I see you I will take strict measures.'" (Female volunteer, focus group discussion)

"Those traditional birth attendants, we have already started telling them to stop delivering [mothers] and if she does that, she will pay a fine." (Male volunteer, focus group discussion)

Two ethical concerns around confidentiality and respect for autonomy arise as volunteers have access to health information that they otherwise would not have. For example, volunteers regularly accessed antenatal care registers at health facilities to confirm who was pregnant in their communities so that they could ensure those women were targeted through the intervention. However, this information should have been kept confidential by the health facility. If a woman did not want others to know she was pregnant and volunteers came knocking at her door—given that they are often known for speaking with pregnant women in the community—it would make her status visible to others without her consent, simply by nature of volunteers visiting her.

"These volunteers offer education at our homes; in every household where there is a pregnant woman, they have to visit it." (Father, 24)

Finally, as EQUIP had quality improvement work going on simultaneously at the health facility and district levels, the overall goal was to ensure that facilities were capable of providing high quality maternal and newborn care services. However, institutional delivery was encouraged very early on, well before the intervention may have achieved any tangible improvements in quality of care. Despite an important range of potentially life-saving improvement topics being introduced at health facilities (prevention of post-partum hemorrhage and improved post-natal care most notably) it remains unclear whether institutions—especially at lower levels—had the capacity to provide even basic emergency obstetric care, which studies elsewhere have shown is not likely.(21) Thus,

encouraging health-seeking when quality of care cannot be ensured may not uphold the principle of non-maleficence. Chapter 7 shares findings around user-perceived quality of care and suggests that improvements are still needed.

A Conceptual Framework for Community Participation within Community-Level Quality Improvement

Although EQUIP as a whole was an externally conceptualised and facilitated intervention, EQUIP was built on the accumulation of successful change ideas—which could be considered micro interventions within the whole—at all three levels. The cumulative outcomes of these change ideas at each level is what ultimately produced the desired impacts of the intervention. Community-level quality improvement within EQUIP was highly participatory, engaging community members to a considerable extent in all aspects of the creation, implementation, and monitoring of change ideas.

The above results, taken together, present a picture of how the factors influencing community participation were carried out within the community-level quality improvement processes of EQUIP. These findings have been used to produce a conceptual framework of how these factors also influence the implementation of community-level quality improvement. Although not an attempt to establish explicit links between community participation and health outcomes, for which there is a gap in the literature, this framework offers an explanation as to how community-level quality improvement may ultimately produce improved health outcomes for mothers and newborns. The primary factors influencing community participation as indicated in Table 5.1 (knowledge and skill transfer to community members, local leadership, local management, local needs assessment, local design and implementation, local design and evaluation, local resource mobilisation, and local ownership) alongside the concepts of receptiveness, satisfaction, and empowerment are identified in the context of the EQUIP intervention, based on what has been learned around their influence.

Influence of community participation principles

Skilled individuals, often with prior volunteering experience, knowledge, and skills, who have gained acceptance from the community are selected *(local leadership and local management)*

Volunteers and extension workers gain new knowledge skills, and capacities. Effective training leads to them completing their work competently and with confidence *(knowledge and skill transfer to community members, local leadership and management, local ownership)*

Volunteers are able to apply new knowledge and skills. Understanding of the local context is used to effectively identify key problems to be addressed *(local needs assessment)*

Volunteers are able to generate plausible change ideas that effectively tackle context-specific problems. Volunteers feel active in the design process *(local design, local ownership, receptiveness and satisfaction)*

Volunteers understand the process of testing change ideas and are able to monitor their initial implementation to correctly identify which change ideas to scale up *(local implementation, local monitoring and evaluation)*

Volunteers confidently implement change ideas, resources mobilized as needed to ensure change ideas can be implemented as planned, community members accept volunteers and their change ideas and modify their behaviours due to change ideas *(local implementation, local resource mobilization, local leadership, local ownership, receptiveness and satisfaction)*

Volunteers have the capacity to correctly monitor and evaluate their work and volunteers see the ongoing of monitoring change ideas as their responsibility and appreciate its benefits *(knowledge and skill transfer to community members, local monitoring and evaluation, local ownership, receptiveness and satisfaction, empowerment)*

Volunteers see improvements in their communities and are further encouraged by their role and the status and respect it affords them in their communities and the knowledge and skills that they are obtaining *(knowledge and skill transfer to community members, local ownership, receptiveness and satisfaction, empowerment)*

Quality Improvement Component

Volunteer and extension worker recruitment

Volunteer and extension worker training

Context-specific problems identified and achievable objectives made

Change ideas generated

Change ideas tested

Best change ideas routinely implemented and community members are receptive to change ideas

Ongoing monitoring and evaluation of change ideas to ensure improvements built and sustained

Volunteers motivated to continue volunteering

Quality Improvement Outcome

Birth preparedness completely and consistently done; increased percentage of births in a health facility; better identification and timely care-seeking for maternal and newborn danger signs; consistent use of infection prevention and control strategies at the household level, during labour, and post-partum

Impact

Reduction in maternal and newborn morbidity and mortality

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Conclusion

Community members participated at a high level within community-level quality improvement. Many of the factors influencing community participation were also present in community-level quality improvement. Additional factors such as the receptiveness and satisfaction of both volunteers and community members and empowerment of community members were also present, and acted as cross-cutting enablers of the intervention. Some of the unique ethical issues present in community-led interventions were highlighted here.

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RESEARCH PAPER COVER SHEET

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SECTION A – Student Details

Student	Tara Tancred
Principal Supervisor	Tanya Marchant
Thesis Title	Implementation of community-level quality improvement in southeastern Tanzania: a mixed methods process evaluation of what worked, what didn't, and why?

If the Research Paper has previously been published please complete Section B, if not please move to Section C

SECTION B – Paper already published

Where was the work published?			
When was the work published?			
If the work was published prior to registration for your research degree, give a brief rationale for its inclusion			
Have you retained the copyright for the work?*		Was the work subject to academic peer review?	

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SECTION C – Prepared for publication, but not yet published

Where is the work intended to be published?	Chapter 6 (Birth Preparedness and Place of Birth in Tandahimba District, Tanzania: What Women Prepare for Birth, Where They Deliver, and Why) has been submitted to BMC Pregnancy and Childbirth
Please list the paper's authors in the intended authorship order:	Tara Tancred, Tanya Marchant, Claudia Hanson, Joanna Schellenberg, and Fatuma Manzi
Stage of publication	Under review

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary)	All qualitative data were conceptualised, carried out and analysed by me. Secondary quantitative data presented were also analysed by me. I wrote the first draft of the paper.

Student Signature: _____ **Date:** 31/07/15

Supervisor Signature: _____ **Date:** 31|7|15

Chapter 6

Research Paper 3: Birth Preparedness and Place of Birth in Tandahimba District, Tanzania: What Women Prepare for Birth, Where They Go to Deliver, and Why

As birth preparedness and facility delivery were the two primary outcomes that were targeted by EQUIP volunteers at the community level, the extent to which these were carried out is presented using secondary data from the EQUIP continuous survey. Qualitative data about *why* birth preparedness was or was not done and *why* facility delivery did or did not happen are presented in order to add nuance to quantitative findings. The relationship between birth preparedness and facility delivery is explored. Suggestions to overcome some barriers to making birth preparedness or delivering at the health facility are presented. This chapter has been submitted to BMC Pregnancy and Childbirth.

Title: Birth preparedness and place of birth in Tandahimba district, Tanzania: what women prepare for birth, where they go to deliver, and why

Authors: Tara Tancred, Tanya Marchant, Claudia Hanson, Joanna Schellenberg, Fatuma Manzi

Abstract

Background: Making preparations for birth and health facility delivery are behaviours linked to positive maternal and newborn health outcomes. We aimed to describe what birth preparations were made, where women delivered, and why.

Methods: Outcomes were tabulated using data derived from a quantitative continuous household survey of women aged 13–49 who had given birth in the past year. Insights into why behaviours took place emerged from analysis of in-depth interviews (12) and birth narratives (36) with recently delivered mothers and male partners.

Results: 523 women participated in the continuous survey from April 2012–November 2013. Ninety-five percent (496/523) of women made any birth preparations for their last pregnancy. Commonly prepared birth items were cotton gauze (93%), a plastic cover to deliver on (84%), gloves (72%), clean clothes (70%), and money (42%). Qualitative data suggest that preparation of items used directly during delivery was perceived as necessary to facilitate good care and prevent disease transmission. Sixty-eight percent of women gave birth at a health facility and 30% at home. Qualitative data suggested that health facility delivery was viewed positively and that women were inclined to go to a health facility because of a perception of: increased education about delivery and birth preparedness; previous health facility delivery; and better availability and accessibility of facilities in recent years. Perceived barriers were a lack of money, absent health facility staff or poor provider attitudes, women perceiving that they were unable to go to a health facility or arrange transport on their own, or a lack of support of pregnant women from their partners.

Conclusions: The majority of women made at least some birth preparations and gave birth in a health facility. Functional items needed for birth seem to be given precedence over practices like saving money. As such, maintaining education about the importance of these practices, with an emphasis on emergency preparedness, would be valuable. Alongside education delivered as part of focussed antenatal care, community-based

interventions that aim to increase engagement of men in birth preparedness, and support agency among women, are recommended.

Background

Facility delivery with a skilled attendant in a centre providing emergency obstetric care is the primary strategy to reduce maternal and newborn mortality.(1-5) Tanzania benefits from having a fairly decentralised health system in which approximately 80% of the population lives within five kilometres of a health facility.(6) However, as of 2010, only 50% of births occurred in a health facility.(7)

Several studies have indicated that birth preparedness is associated with uptake of health facility delivery.(8-11) Recommended birth preparedness plans differ between countries, but most include: planning the location of delivery and knowing the location of the nearest health facility; identifying a birth attendant; saving money for birth-related and emergency expenses; making arrangements for transport to a health facility for birth or complications; and identification of a blood donor.(8) In 2002, Tanzania adopted a birth preparedness and complication readiness strategy as part of focussed antenatal care, with the overall goal of increasing facility births.(12) The strategy emphasised knowing the expected delivery date; identifying a place of birth; identifying someone to care for the woman's family in her absence; preparing essential items needed for a clean birth; identifying at least two blood donors; preparing funds for transportation; identifying a decision-making family member to accompany a woman during labour; and the importance of delivering in a health facility.(12-14) This new approach also suggested movement away from a "risk approach" strategy that placed emphasis on facility delivery for women with high-risk pregnancies, which is now emphasised for all women.(15)

Although the intended connection between birth preparedness and health facility delivery is clear, the two are not often reported together.(9, 16) In the context of a quality improvement project to improve maternal and newborn health in Tandahimba district of southern Tanzania (the Expanded Quality Management Using Information Power (EQUIP) project), (17-19) we investigated how many women made birth preparations, what they prepared, and what their place of delivery was. We then used qualitative data from in-depth interviews and birth narratives to explain why birth preparations were made and what determined place of delivery.

Methods

Results were derived from a continuous quantitative household survey conducted April 2012–November 2013, and qualitative in-depth interviews and birth narratives conducted in 2013.

Study Setting

The study setting has been described in more detail elsewhere.(17) Tandahimba is a predominantly rural district with a population of 227 500.(20) Tandahimba has one district hospital, three health centres, and 30 dispensaries. As of 2010, maternal and newborn mortality were worse here than the national averages at 712 deaths per 100 000 live births and 31 deaths per 1000 live births respectively.(7, 21) The majority of inhabitants are from the Makonde ethnic group, are Muslim, and their primary economic activity is farming, particularly of cashew nuts.(22, 23)

Quantitative Data Collection

Quantitative data were collected as part of the continuous cross-sectional modular household survey (see Marchant et al).(18) Briefly, the probability sampling scheme for this survey was designed to be representative at the district level, with six rounds of data being collected from November 2011–April 2014. In each round, approximately 2300 households were surveyed and all consenting resident women aged 13-49 were interviewed. In the women's module, participants with a recent live birth were identified using pregnancy histories, then asked about place of delivery for that birth, whether they had made birth preparations, and if so, to report which items they had prepared. Here, data are presented from April 2012–November 2013 only to allow for temporal overlap with the period of pregnancy and childbirth referenced by women in qualitative data collection to the greatest extent possible.

Qualitative Data Collection

Qualitative data were collected from 12 semi-structured in-depth interviews with mothers who had recently given birth, and 23 birth narratives with recently delivered mothers and 13 men whose partners had recently given birth. Birth narratives were considerably more open than in-depth interviews, leaving opportunities for participants to share their narrative around their or their partner's experiences in pregnancy and

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childbirth. However, interviewers probed as necessary to ascertain greater detail or explanation. All in-depth interviews and birth narratives were carried out in Swahili. Participants were selected to be as diverse as possible (according to age, number of children, general socioeconomic status, place of delivery, whether a caesarean section was carried out, and if twins had been born for themselves or their partners); see Tancred et al for more detail about participants.(19)

Analysis

Stata 13 was used to generate descriptive statistics for survey respondents with regard to age, marital status, religion, and birth preparation and place of delivery outcomes. Percentages were generated using the *svy* command to account for the clustered survey design, and statistical evidence of association between birth preparedness and place of delivery was determined using a weighted Pearson's chi-squared test.

All qualitative in-depth interviews and birth narratives were analysed through constant comparison, and interview or narrative guides were adjusted to probe further into emerging themes or to further explore divergent cases. Qualitative data were coded line-by-line and analysed thematically using NVivo 10 software. Data were collected and analysed until theoretical saturation had been reached. Emergent themes are reflected in the results through representative quotations.

Ethical Considerations

This work was approved by the institutional review boards at Ifakara Health Institute and the National Institute of Medical Research (Tanzania) and the London School of Hygiene and Tropical Medicine (UK). All transcribed interviews and birth narratives were anonymised and treated as confidential. All participants gave written informed consent.

Results

Participant Characteristics

Five hundred and twenty-three women aged 13-49 who had given birth in the previous 12 months at the time of the survey (April 2012–November 2013) participated in the continuous survey (Table 6.1).

Table 6.1 Continuous survey (April 2012–November 2013) participant characteristics with a birth in the previous year

Participant Characteristics	N	%
Age		
13–19	93	18
20–29	211	40
30–39	158	30
40–49	61	12
Total	523	100
Marital Status		
Currently married	408	78
Previously married	58	11
Never married	41	8
Unmarried but living with partner	16	3
Total	523	100
Religious Background		
Christian	8	2
Muslim	515	98
Total	523	100

Among participants of in-depth interviews and birth narratives, mothers' ages ranged from 16–44 years, with an average age of 27. Mothers' parity ranged from one-to-six, and 12 women out of 35 had given birth at home. Fathers' ages ranged from 21–60 years, with an average age of 36. The number of children for each father ranged from one-to-eight, with four out of 13 of their partners delivering at home.

Birth Preparedness

In the continuous survey, 95% (496/523, 95% CI 92–97%) of women reported making birth preparations for the last live birth that they had in the 12 months prior to the survey. When asked to list what they had prepared, women reported some items more commonly than others (Table 6.2). Of the recommended items for birth preparedness, cotton gauze, a cover to deliver on, gloves, and clean clothes were prepared by almost 70% or more of all respondents. Money was prepared by 42% of respondents, and other

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recommended items needed during labour and delivery like a razor, a basin, and soap were cited by 10–20% of participants. Arrangement of transport and identification of a health facility for delivery was stated by only 2% or less of respondents.

Table 6.2 Birth preparedness among survey respondents who had given birth in the previous year

Items prepared	n/496	%	95% CI
Cotton gauze	460	93	90–95
Cover to deliver on	418	84	81–87
Gloves	359	72	67–77
Clean clothes	267*	70	65–74
Money	206	42	37–46
Razor	86	17	14–21
Basin	64	13	10–16
Soap	56	11	8–15
Cord clamps or thread	52	10	8–13
Bucket	51	10	8–13
Uterotonic drugs	26	5	3–8
Transport	9	2	1–3
Identification of facility for delivery	3	1	0–2

*N=384 due to missing values

All of the items in Table 6.2 were also cited during in-depth interviews and birth narratives, with some insights as to why they were prepared. For example, a bucket for carrying water or disposal of placenta, a basin for washing clothes, thread or a cord clamp for tying the umbilical cord, a clean razor for cutting the umbilical cord, and soap, both for washing clothing, or for washing the mother. Preparation of uterotonic drugs like oxytocin to be used by a skilled birth attendant to induce labour or to prevent and treat post-partum bleeding and a syringe or needle to administer them was also indicated by participants. The amount of money prepared stated by participants in in-depth interviews ranged from as low as 12 000 Tanzanian shillings (~7.5 USD) to 100 000 Tanzanian shillings (~64 USD). Arrangement of transport was regularly mentioned as something that was done when a woman went into labour, rather than a consideration that was made ahead of time when other birth preparations were made.

In-depth interviews and birth narratives provided some insight as to why some items were prepared more commonly than others. All participants made at least some birth preparations. As reflected in Table 6.2, items used directly in birth were perceived to be of particular importance. Further to their immediate use during delivery, having these

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items was linked by participants to the care that would be received in a health facility; together, these were the primary motivators for women to make preparations. It was even stated by a few respondents that not making preparations might push a women to have a home birth for fear of refusal at the health facility.

"In the hospital during service, if they ask you to bring gloves, you give them, bring a bucket, I give them, so services go well. [Interviewer: What could have happened if you did not have those items?] They could have refused to help me in the hospital." (Mother, 38)

An additional motivator for women was that they felt that these items were important to help in the prevention of infectious disease transmission. Having your own plastic sheet to deliver on, gloves, and a clean razor were seen to be of particular importance for this reason. Many referred to "homa kubwa" (the "big fever"), referring to HIV, and suggested that there are more diseases "nowadays" that women need to be protected against than in the past. As such, preparation of birth items was seen as essential to prevent the transmission of infections such as HIV.

"You know nowadays there a lot of diseases, so if we use the same equipment there is a possibility of disease transmission." (Mother, 44)

Irrespective of parity, it was commonly stated that the education around birth preparedness that was given by EQUIP volunteers to mothers and fathers in their homes was useful in helping women to know exactly what to prepare. Women who had previously given birth indicated that for their past births, many of the functional items used in delivery such as gloves, a razor to cut the cord, a plastic sheet for laying on the bed, and others, were typically found in the hospital. Now, the expectation was for women to bring these items with them to the health facility.

"[Without encouragement from the EQUIP volunteers] I could not have prepared myself because during the previous pregnancies you find all those things in the hospital. I couldn't have known what to prepare—probably I would have carried a piece of khanga [cloth], thinking that all the services are available at the hospital." (Mother, 39)

Data from birth narratives and in-depth interviews suggested that men were typically charged with the responsibility of purchasing birth items, or conversely, giving money to their partners for them to buy the items. As such, men played a key role in ensuring birth preparations were made. It was perceived that, where birth preparations were not made, it was failure of the male partner, either because he was no longer in the pregnant woman's life, or because he had failed to purchase the items due to financial constraints or lack of will. Making birth preparations was seen to be a particularly difficult undertaking for single pregnant women.

"It is possible there is a person whom you depend on, and [he] is poor. He doesn't have money, like your parents [who are also poor], and the one who made you pregnant has rejected you, and if the parent has little capacity, that equipment [for birth] won't be available." (Mother, 19)

Finally, although EQUIP volunteers and health facility staff stressed the importance of starting to prepare early in a pregnancy, some participants held the view that items could be purchased at the health facility if preparations were not complete by the time of delivery. Furthermore, some had been told to replace prepared items while being at the facility, so they perceived early preparation to be futile.

"I planned to buy those things when I got money, but I felt labour pain without finishing doing delivery preparations, so I went to the hospital and got all the needed things there." (Mother, 24)

"I won't prepare, rather, I will save money. I will just buy things at the hospital in case there are things that I will be asked to buy. I already know all things are sold there." (Father, 32)

Place of Delivery
Table 6.3 below shows place of delivery results from the continuous household survey and highlights what percentage of women delivering at each place also reported making birth preparations. Overall, 68% of births took place in a health facility and only 30% at

home. Among all facility births, 99% of mothers made any birth preparations, compared to only 86% of mothers delivering at home (chi-squared test p-value <0.001).

Table 6.3 Place of delivery and birth preparations made among survey respondents

Place of delivery	n/N	%	95% CI	Birth preparations made (n/N)	%	95% CI
Hospital	164/526	31	25–38	161/163	99	95–100
Health Centre	50/526	10	6–15	50/50	100	100
Dispensary	144/156	27	22–33	142/144	99	94–100
Home	156 /526	30	25–35	132/154	86	78–91
Other	12/156	2	1–4	11/12	92	56–99

Health facility delivery was viewed very positively. The key perceived benefit of health facility delivery was that safety for the mother and the newborn were ensured. The most commonly cited reasons as to why health facility delivery had increased included:

- increased education of mothers and fathers about maternal and newborn health, both received at health facilities during antenatal care, but also from village volunteers like those from EQUIP;

    "I received education for my second child. Now they don't allow anyone to deliver at home. Most of us now go to the hospital for delivery." (Mother, 25)

- special efforts being made to sensitise women who are young or primiparous or have had five or more children about the necessity of them delivering in a hospital due to their increased risk of complications;

    "They said that this is the fifth pregnancy, once the person reaches the fifth pregnancy they should go to the hospital." (Mother, 35)

- women having previously experienced complications and therefore understanding the importance of health facility delivery;

    "[For the first pregnancy] the baby was too big, so they enlarged her birth canal [gave her an episiotomy]—that couldn't be done at home … [Because] I saw that the first pregnancy had developed complications…I told [my wife] to prepare herself to go to the hospital." (Father, 35)

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- women generally having positive experiences at the health facility and choosing to return for future births;

  "I have seen great success in my first pregnancy; I didn't face any problems…they followed up and I did listen to them…I have seen its importance." (Mother, 19)

- the prohibition of homebirths in some villages often through the use of fines for mothers or for traditional birth attendants who may be assisting them—established by village leaders or by volunteers like those in EQUIP as part of their strategies—or the refusal of services by local health facility staff (see Tancred et al for more detail on this point (19));

  "But if you deliver at home [then] at the time you go to facility, they refuse to attend you, other staff may even refuse to give you a card." (Mother, 19)

- an increased number of facilities and more reliable modes of transportation, namely motorbikes.

  "[Health facilities] were few, and we used to go for long distances and there was no reliable transport. People used to carry pregnant women on a bicycle or in a basket and take them to hospital, but now if labour pains start they take them faster using motorbikes." (Mother, 38)

During in-depth interviews and birth narratives, women who had home births said that they had made birth preparations with the intention to deliver in a health facility. They commonly reported that the home birth occurred because they were alone in the house with her partner working or travelling elsewhere. One consequence of being alone was that a woman may have failed to get transport to a health facility, as men typically took on the responsibility of arranging and paying for transport. Interestingly, such was the case even if these women had been left money by their partners, suggesting a potential need for female agency in the absence of others—husbands or other family members—who would make the decision to seek care. Participants did not refer to emergency preparedness for the situation when a woman might be alone and starting labour.

"I was alone…My husband was not around and my children were at school, it was around two…on the way back from school, my child went to tell his father in order to

find transport…When my husband arrived with transport I had already delivered."
(Mother, 29)

"I was alone…I didn't intend to [give birth at home], I didn't know [I was in labour]
and I stayed for a long time…My husband left enough money—when he travelled he left
me one hundred thousand shillings [~64 USD]." (Mother, 24)

If her partner was present and a woman still gave birth at home, it was typically due to
no health facility staff being present, which was particularly true among women
accessing dispensaries. Poor provider attitudes were also seen to discourage women
from attending the health facility.

"The labour pain started and we sent her there [to the dispensary], but there was no
one to attend her … The problem is, there are only two staff, and if they [leave], this
facility remains with no one." (Father, 40)

"The nurse just throws the patient on the bed, until the one who has come to look after
the patient follows the nurse and asks her to go and look at her patient but she doesn't
and she says, 'I feel sleepy, I am going to sleep'. So she goes to call the traditional birth
attendant in the village to help with the birth [instead]." (Mother, 35)

Otherwise, childbirth at home was reported to be an accident or something that occurred
in an urgent and unexpected situation. Less commonly, respondents discussed a lack of
knowledge on the mother's behalf, or financial struggles that would prevent a woman
from being able to get to a health facility at all. As for both the long-term preparation of
money and items needed for delivery, and the short-term arrangement of transportation,
the need for a present male in order to make decisions was key, and as such, the absence
of a male partner—either a temporary absence, or if a woman was no longer with her
partner at all—was also regularly noted as a reason that may cause women to deliver
from home.

"There are changes because nowadays there is the use of services professionally, and
mothers are educated and they go to deliver at the health facility. Nowadays to give
birth at home is an emergency." (Mother, 39)

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"Others might have no money. Another problem is she might have no one to take her to the health facility. Some are single mothers. Some…women are rejected, while others do not have relatives to help them." (Mother, 30)

Discussion

As seen in other studies from Tanzania, birth preparedness was carried out among the vast majority of pregnant women.(24, 25) Qualitative results highlighted that items that would be used directly in delivery were perceived to be of the greatest importance. The perception that having these items would ensure that appropriate care was received and would also be instrumental in minimising infectious disease transmission was widely held. Health facility delivery was an increasingly popular behaviour, with only 30% of births being carried out at home. As has been found in other settings, increased education to parents about maternal and newborn health—including that received from village volunteers like those of EQUIP,(26-28), positive past experiences at health facilities,(29-32) prohibition of homebirths in some villages, and increased accessibility of health facilities were all perceived to be important contributors to this decrease in homebirths.(28, 30, 33) Qualitative data highlighted that in the rare instances where birth preparedness or health facility delivery were not done, the primary causes were: delaying to travel to a health facility; a lack of health facility staff or poor provider attitudes; financial barriers; and a lack of male involvement.(16, 28, 33-37) Finally, the link between birth preparedness and health facility delivery in this setting was highlighted by our finding that, although 86% of women who gave birth at home made at least some preparations, they were significantly less likely to have done so than those delivering at a facility (99%).

Given the link between birth preparedness and health facility delivery, there is an added value of having community-based volunteers who are in a position to reiterate messaging around both within a family context, and to follow-up to ensure birth preparations were being made. However, there has been a failure to take up some aspects of birth preparedness as suggested in Tanzanian policy, including the identification of a blood donor, which was not stated by any respondents. There also appears to be a need to underline the importance of making preparations from early in pregnancy, and emergency preparedness around getting to a health facility in the event of unexpected or early labour. The attitude expressed by some that the functional items to be used during birth could simply be bought at the health facility might also lead to a delay in preparedness. If an insufficient amount of money has been saved, those items might not be purchased at all, which, as participants suggested, might inhibit care-

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seeking during delivery. The perceived refusal of services to women who were not prepared for birth should be addressed through supportive supervision and provider education.

It has been well documented that in Sub-Saharan Africa, as in other settings, males strongly influence payment for birth items, transportation to health facilities, and decision-making around care-seeking practices.(29, 38-44) Despite Tandahimba district falling within an area of Tanzania that is matrilineal,(45) qualitative data suggested that women still lacked decision-making capacity. The implications of these norms are twofold: first, women need to have increasingly more agency in terms of decision-making, especially when her partner may not be present, and second, men need to be educated about pregnancy and childbirth to the greatest extent possible. Education of males, often through attendance of antenatal care with their partners, has been found to be an important predictor of involvement in birth preparedness and childbirth.(41, 46, 47) A benefit of community-based initiatives is that they are positioned to support the engagement of men in pregnancy and childbirth.(48) The ongoing encouragement of male involvement in antenatal care may be a particularly useful strategy to provide a platform for education. Future research on the role of males and the decision-making capacity of women around birth preparedness and facility delivery in this context would be valuable.

Limitations

The household survey was carried out throughout the entire district of Tandahimba, but qualitative data were only collected from one division. The question around birth preparedness was open, with women encouraged to state anything they had prepared rather than being asked to respond to a structured list. Given that almost 70% of births occurred at a facility, this method may have resulted in an underestimate of identification of a facility, saving money, and arrangement of transport, which other studies have reported to occur more frequently.(24, 25) Finally, as there is a very strong understanding that health facility delivery and birth preparedness are favourable behaviours, there is the possibility that data were influenced by responder bias, with participants responding more positively about both practices than actually occurred.

Conclusion

This study highlighted that the majority of women make at least some birth preparations and give birth in health facilities. Women seemed to place importance on functional items needed for delivery rather than on arranging transport or identifying a health facility, and did not always appreciate the importance of making birth preparations early. As such, there is a need to emphasise emergency preparedness in education to women and their partners during antenatal care. Furthermore, to address some barriers to making preparations or delivering in a health facility, it would also be beneficial to continue to encourage increased male engagement in pregnancy and childbirth as well as greater female agency around both. Community-based interventions may be well poised to work toward these aims.

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RESEARCH PAPER COVER SHEET

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SECTION A – Student Details

Student	Tara Tancred
Principal Supervisor	Tanya Marchant
Thesis Title	Implementation of community-level quality improvement in southeastern Tanzania: a mixed methods process evaluation of what worked, what didn't, and why?

<u>If the Research Paper has previously been published please complete Section B, if not please move to Section C</u>

SECTION B – Paper already published

Where was the work published?			
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SECTION C – Prepared for publication, but not yet published

Where is the work intended to be published?	Chapter 7 (Using Mixed Methods to Evaluate Perceived Quality of Care in Southern Tanzania) was submitted to the International Journal for Quality in Healthcare
Please list the paper's authors in the intended authorship order:	Tara Tancred, Joanna Schellenberg, and Tanya Marchant
Stage of publication	Under review

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary)	All qualitative data were conceptualised, carried out and analysed by me. Secondary quantitative data presented were also analysed by me. I wrote the first draft of the paper.

Student Signature: _____   Date: 31/07/15

Supervisor Signature: _____   Date: 31 7 15

Chapter 7

Research Paper 4: Using Mixed Methods to Evaluate Perceived Quality of Care in Southern Tanzania

As a quality improvement intervention, EQUIP aimed to improve the quality of health services, largely through its activities at the health facility and district levels. This chapter presents and compares quantitative findings around user-perceived quality of care derived from EQUIP continuous survey data to qualitative findings around the same topic from qualitative in-depth interviews and birth narratives. Findings are organised around: human and physical health resources; cognition: understanding care and being aware of options; respectful, dignified, and equitable treatment; and emotional support. Suggestions for the usefulness of integrating mixed methods into the evaluation of user-perceived quality of care are presented. This chapter has been submitted to the International Journal for Quality in Health Care.

Title

Using mixed methods to evaluate perceived quality of care in southern Tanzania

Authors

Tara Tancred, Joanna Schellenberg, and Tanya Marchant

Abstract

Objective: To compare perceived quality of maternal and newborn care using quantitative and qualitative methods

Design: A continuous household survey (April 2011–November 2013) and in-depth interviews and birth narratives

Setting: Tandahimba district, Tanzania

Participants: Women aged 13–49 who accessed health services in the 12 months and had a birth in the two years prior to the survey. Recently delivered mothers and their partners participated in in-depth interviews and birth narratives

Interventions: None

Main outcome measures: Perceived quality of care

Results: Quantitative: 1138 women were surveyed and 93% were confident in staff availability and 61% felt that required drugs and equipment would be available. Measures of provider attitudes were very positive. Only 51% of respondents were given time to ask questions. Drinking water was easily accessed by only 60% of respondents using hospitals. Unexpected out-of-pocket payments were higher in hospitals (49%) and health centres (53%) than in dispensaries (31%). Qualitative data echoed the lack of confidence in facility readiness, out-of-pocket payments, and difficulty accessing water, but was divergent in responses about interactions with health staff. More than half described staff interactions that were disrespectful, not polite, or not helpful.

Conclusion: Both methods produced broadly aligned results on perceived readiness, but divergent results on perceptions about client-staff interactions. Benefits and limitations to both quantitative and qualitative approaches were observed. Using mixed methodologies may prove particularly valuable in capturing the user experience of maternal and newborn health services, where they appear to be little used together.

Introduction

Expanded Quality Management Using Information Power (EQUIP) was a quality improvement intervention that aimed to improve the supply of and demand for quality maternal and newborn health (MNH) services in southern Tanzania.(1-3) Consistent with the Donabedian model, which suggests that information about quality of care is best drawn from learnings around structure (the setting in which care is delivered), processes (the interactions between providers and clients), and outcomes, the EQUIP evaluation, too, explored these categories.(4) As part of structure and process in particular, both the quality of MNH services provided to the population and population-level user perceptions about service quality were explored.

Positive perceived quality of care among users has been shown to influence health-seeking behaviours across the spectrum of maternal and newborn care.(5-10) It is multi-dimensional, focussing on dimensions of: treatment with respect and dignity; being provided information and education; having physical comfort; involvement of social supports like friends and family as needed; courtesy and availability of staff; trust in provider treatment; client autonomy and participation in decision-making; and reliance on confidentiality.(11-14) Many of these aspects of perceived quality of care overlap with structural and process components within the Donabedian model, and aspects such as respect, confidentiality, supportive care, and participation in decision-making are key indicators of high quality of maternal, newborn, and child care overall.(4, 15)

Qualitative methods used to assess quality of care commonly rely on focus group discussions and in-depth interviews.(16-22) Although often providing rich insights, they are very time consuming and cannot provide population-level measures that can be tracked over time and that can represent different population subgroups. As such, there is the desire to use quantitative methods that can be used at scale. Surveys, often populated with a number of scales linked to dimensions of quality, are widely used to gain measures of perceived quality of maternal and newborn health from users.(23-30) However, dimensions of quality of care may be too complex to describe using traditional large-scale survey methods, given that the selected measures of quality may not be as relevant across settings and respondents may lack a reference point from which to base responses in structured questionnaires.(31, 32) For example, even simple measures of structure, such as a facility's level of cleanliness, may have different

meanings to participants. Furthermore, there is a need to encompass aspects of care that are specific to a context, which may not be reflected through such methods, which often draw from or aim to produce standardised measures.(33-35) For example, within a rural community where having access to birthing posts for women to use—so that they can assume a squatting position rather than labouring on their backs—may be an important aspect of quality of care. "Having access to equipment to enable indigenous birthing practices" is not likely to be a measure of quality that would be seen across contexts, and excluding such measures may preclude understanding an important aspect of perceived quality. Finally, Batchelor et al note that surveys tend to yield disproportionately positive outcomes in terms of patient satisfaction with various measures of their care.(36)

The World Health Organization's *Every Mother, Every Newborn* initiative and large-scale efforts by organisations like the White Ribbon Alliance have emphasised the importance of gaining the user's experience of MNH services.(37, 38) As this agenda progresses, there is space for improving how perceived quality of care is measured. The suggested literature around perceived quality or client satisfaction from the World Health Organization is dominated by surveys in clinical settings. Focus group discussions are mentioned occasionally, but the use of quantitative and qualitative measures together is not emphasised.(29, 39-43) More of the same is not likely to yield the insights that are needed to ultimately bring user perspectives into the improvement of health services. As such, there is a need for better ways to measure quality of care that can both provide population-level estimates and reflect context-specific perceptions around quality. The use of mixed methodologies in evaluating quality of maternal and newborn health services as perceived by users is little-used, particularly in Sub-Saharan Africa.(44-47) However, the framework for evaluating quality of maternity care by Hulton et al, the dimensions of which are described in more detail below, suggests a mix of methods, including provider interviews, exit interviews, observation, labour and case notes, and surveys.(13)

Here we present findings from both quantitative and qualitative approaches used to evaluate perceived quality of care among users of MNH services in Tandahimba district, Tanzania. We highlight where findings were similar, where they differed, and suggest how overall measurement of perceived MNH quality of care could be improved.

Methods

We used a mixed methods study design in which quantitative and qualitative data around perceived quality of care in the same locality were independently collected and analysed.

Study Setting

The study setting has been described in detail elsewhere.(1) Briefly, Tandahimba. district, southern Tanzania, has a population of 227 500, the majority of whom are rural-dwelling cashew farmers from the Makonde ethnic group.(48) Coverage of antenatal care and facility delivery are high, but the area has persistently high maternal (712 deaths per 100 000 live births) and neonatal (31 deaths per 1000 live births) mortality.(49-51) There are 34 government owned health facilities in the district, including one district hospital and three health centres, with the remaining health facilities being dispensaries.(52, 53)

Quantitative Data Collection

Quantitative data were generated as part of the EQUIP project's continuous household and health facility survey.(2) The household survey applied a modular questionnaire, and was designed to represent outcomes at the district level. During the period from February 2011–November 2013 a total of 11 473 households were sampled and consented to participate. In sampled households, all resident women aged 13-49 were interviewed about their recent fertility history, including their experiences accessing MNH care during the twelve months prior to survey. A priori measures of perceived quality of care were defined, derived from literature reporting measurement of service quality perceptions, especially those carried out in African or low-income country contexts.(23, 24, 45, 54-58) These were then integrated within the structured questionnaire and pre-tested prior to data collection. Questions about confidence in availability of services were asked in general and questions about experiences accessing health care were asked in relation to the last health facility accessed.

Qualitative Data Collection

Between May and October 2013, qualitative data were collected from in-depth interviews (12), birth narratives with mothers (23) who had recently given birth, and fathers (13) whose partners had recently given birth. Although men were not

interviewed in the continuous household survey, we felt they may have important contributions to make on the topic of quality of care. Participants were asked to share their experience from the start of their—or their partner's—labour until the post-partum period, being probed about the care that was received throughout each step, what they did and did not like, and how they felt health services could improve, if it was believed they should. From four villages across one division of Tandahimba district, respondents were purposively selected to reflect a broad range of perspectives, including different age, parity, place of the most recent child's birth (home, dispensary, health centre, or hospital), and socioeconomic status. See Tancred et al for more detail about participants.(3)

Analysis

Continuous household survey data from Tandahimba district were summarised and descriptive statistics about participants and their responses to questions about their most recent experience of care within the past 12 months for them or their child were tabulated using the *svy* command in Stata 13 to account for the clustered survey design. Evidence of statistical difference in perceived quality outcomes by characteristics of study participants or level of health facility was determined using a weighted Pearson chi-squared test. Analysis was restricted to women aged 13–49 who had a live birth in the two years prior to survey and who reported having accessed health services for themselves or their newborns in the past 12 months (April 2011–November 2013).

Using in-depth interviews or birth narratives, women or their partners were asked about their most recent experiences around pregnancy, birth, and post-partum care, typically within the past one-to-three months. Qualitative data were analysed thematically using constant comparison, in which data collection tools were adjusted to further explore emerging themes or divergent cases. Familiarisation with all scripts was carried out and data were coded line-by-line and higher-level themes were generated using NVivo 10 software. Representative quotations have been selected to indicate the most prominent themes.

To enhance the comparison of findings from the two data sources, both quantitative and qualitative responses were organised using the Framework for Evaluation of Quality of Care in Maternity Services.(13) This framework has four categories: (1) Contact with human and physical resources: impression of the state of the infrastructure, cleanliness,

etc.; contact time with staff; impression of treatment; and sense that staff are competent enough to provide care (2) Cognition: information is conveyed in an understandable way, using acceptable language, and questions have been answered; women know their options and have real informed choice; reasons for care are explained; and information about post-partum care is effectively conveyed (3) Respect, dignity, and equity: women feel they have been treated with respect; women do not undergo unnecessary and humiliating procedures; cultural practices that do not interfere with quality are respected; women face no discrimination; and services are priced appropriately for the catchment area (4) Emotional support: women can maintain self-control and preserve their self-esteem; women choose their social support—typically who will be with them during labour; women are treated with honesty, kindness, and understanding; staff are aware of their supportive role; and processes exist where providers can identify and respond to user expectations.

Qualitative and quantitative findings were compared side-by-side to determine which findings were the same and which were different—i.e. to ascertain the convergent validity of the data.(59)

Ethical Considerations
Both the quantitative and qualitative studies received favourable review from the ethics committees at the London School of Hygiene and Tropical Medicine (United Kingdom), Ifakara Health Institute (Tanzania), and the National Institute for Medical Research (Tanzania). Participant anonymity and confidentiality were respected throughout, and all participants underwent an informed consent process.

Results

In the household survey, 1338 women aged 13–49 who had a live birth in the past two years and had accessed health services in the past 12 months prior to the survey (April 2011–November 2013) were interviewed. The majority were aged 20–39 years, were married, and were Muslim. Almost three-quarters of women accessed a dispensary in their most recent visit to a health facility (Table 7.1). Most (36%) of women accessed services for their child, 26% went for a routine check-up for themselves, 9% of respondents went because they were sick, 8% went for reproductive health services, and the remainder were visiting the facility for other reasons.

Table 7.1 Characteristics of respondents accessing health services in the past 12 months from the survey date

Participant Characteristics	N	%**
Age		
13–19	166	12
20–29	592	44
30–39	437	33
40–49	143	11
Total	1338	
Marital Status		
Currently married	1001	75
Previously married	208	16
Unmarried but living with partner	30	2
Never married	99	7
Total	1338	
Religious Background		
Christian	21	2
Muslim	1316	98
Total*	1337	
Facility type most recently accessed		
Hospital	193	14
Health centre	162	12
Dispensary	983	73
Total	1338	

*One missing value **Percentages do not always add up to 100 due to rounding

Among participants of in-depth interviews and birth narratives, mothers' ages ranged from 16–44 years. Mothers' parity ranged from one-to-six. Fathers' ages ranged from 21–60 years. The number of children for each father ranged from one-to-eight.

Contact with Human and Physical Resources

From the survey, reported confidence in finding staff available when assessing a health facility was high (93%, 1244/1338, 95% CI 91–94). However, only 61% (817/1338,

95% CI 59–64) were confident that the facility would have sufficient drugs and equipment.

However, qualitative data suggested that concerns about both issues affected perceived quality. Particularly in reference to trying to access dispensaries, many participants pointed out that there were too few staff, which further contributed to poor quality of services. If staff had to leave for any reason, the facility would be left unmanned.

"There are few health workers. I mean, the patient might complain like maybe she is being troubled by her heart, but if you go to see the health worker inside and tell her, you won't find her ... So you see, there are few workers, and if you find another one and then you explain to her, she will see you as if you are troubling her since she is busy, so she might tell me, 'go and wait there', and you might wait for more than an hour without her coming." (Father, 35)

"There are two only two attendants in this centre, so the service availability is very low. Even if there was improvement done earlier, still there is a need to improve the staff so that there will be quality service at the health centre." (Father, 55)

Many respondents also expressed frustration at the lack of drugs and equipment at the health facilities. In addition to items for childbirth, vaccinations, health cards, insecticide treated bednets, and other medications were commonly raised as things that may not be available at the health facility.

"Like for vaccinations, you might go on Friday and you are told there are no vaccines and that they are not available, and if you are sick the medicine is not available, they prescribe it and you go and buy it at the pharmacy." (Mother, 16)

"If you go to the facility ... they will write in the exercise book to go and buy drugs because there are no drugs." (Mother, 26)

Survey questions about the client experience during last health care visit revealed that at least 70% of respondents were satisfied with the infrastructure of facilities. However, there was statistical evidence to suggest that infrastructure in hospitals was perceived to be of lower quality than at other levels of care, with just 60% of respondents reporting

that drinking water was easily accessible when they visited a hospital (p=0.002), and 62% reporting that they had perceived the hospital toilet to be clean (p=0.002) (Table 7.2).

Table 7.2 Contact with resources: user-reported accessibility of drinking water and perceived facility and toilet cleanliness

Drinking water was easily accessible			
	n/N	%	95% CI
All women	940/1338	70	67–74
Level of Facility Accessed			
Dispensary	707/983	72	68–76
Health Centre	118/162	73	67–78
Hospital	115/193	60	52–67
Facility perceived to be clean			
	n/N	%	95% CI
All women	1312/1338	98	97–99
Level of facility accessed			
Dispensary	963/983	98	97–99
Health Centre	159/162	98	95–99
Hospital	190/193	98	95–99
Toilet (if accessed) at facility perceived to be clean			
	n/N	%	95% CI
All women	250/314	80	73–85
Level of facility accessed			
Dispensary	178/208	86	80–90
Health Centre	29/37	78	58–91
Hospital	43/69	62	48–75

Similarly, a lack of access to water in hospitals was mentioned in the qualitative data: water was not always available and access was restricted to certain times during the day. During childbirth, for example, whoever accompanied the woman to the health facility may be expected to collect water from elsewhere or bring it from home.

"Imagine that you need water in the morning and you are told to wait until 3 p.m.; a new baby has come and you need water for washing, etc. How can you force someone to wait until 3 p.m.? That is impossible. " (Father, 38)

"Water should be available for the pregnant women, so that she may use it for washing and bathing. [Interviewer: Is there no water at the hospital?] Water we usually carry from home, like me, I usually carry ten litres for starting." (Mother, 35)

Cognition: Understanding Care and Being Aware of Options

In the survey, 95% of respondents reported that they were listened to carefully by the health worker and 88% suggested that they understood all aspects of their care in their most recent visit to a health facility. These findings were consistent across the levels of health facility accessed. The one dimension that was reported less positively was on sufficient time given to ask questions of health workers, which only 51% of respondents reported occurred (Table 7.3).

Table 7.3 Cognition: user-reported experiences asking questions, being listened to, and understanding providers

Respondent given enough time to ask questions			
	n/N	%	95% CI
All women	684/1338	51	48–54
Level of Facility Accessed			
Dispensary	498/983	51	47–54
Health Centre	86/162	53	45–61
Hospital	100/193	52	44–60
Health worker listened carefully to respondent			
	n/N	%	95% CI
All women	1268/1338	95	93–96
Level of facility accessed			
Dispensary	933/983	95	94–96
Health Centre	152/162	94	89–96
Hospital	183/193	95	92–97
Diagnosis, and/or advice, and/or treatment understood			
	n/N	%	95% CI
All women	1171/1338	88	86–89
Level of facility accessed			
Dispensary	861/983	88	86–89
Health Centre	144/162	89	82–93
Hospital	166/193	86	79–91

In contrast, using qualitative methods, both positive and negative interactions with providers were mentioned by participants. In some instances, the quality of the interaction with the provider seemed to stem from the amount of information that was provided to the client. That is, if clients received thorough explanations of their care and were given education, they spoke highly of their interaction with the provider. Furthermore, women were often aware of the services that they should have received. As such, when services met their expectations, they were typically satisfied and deemed the quality of care to be high.

"I was very well received and assisted the way it is supposed to be." (Mother, 22)

However, it was often indicated that no explanations or education was provided, or the client felt ignored, resulting in care being perceived very poorly. There were instances where women described having a vaginal exam, a catheter inserted, or being given oxytocin and generally not understanding why.

"I was satisfied because they just received me and helped me…in delivery, there are some people they tell you, 'I delivered myself, I went to hospital but I delivered myself; the nurse was not there, the nurse was called while the child had been delivered'. So as I perceived it, I have been supported by the nurse until I delivered, that is why I am saying I was satisfied with their support." (Mother, 35)

"The nurse put on gloves and inserted her hand in the vagina. [Interviewer: What was she looking for, did she tell you?] She didn't tell me anything. She removed the gloves and told me to wake up." (Mother, 29)

Participants consistently cited being ignored and not receiving any information about treatment or what they were expected to do, which was particularly true of mothers responding about their first birth.

"If they come and remind us on what to do, it becomes easier to remember, but throwing us in the bed without any follow-up, are we going to know what's going on?" (Mother, 25)

"They didn't educate me on how to give birth, so I didn't know anything. And there wasn't any doctor who told me, 'you are supposed to do it this way'; I was just suffering there until the [birth] happened spontaneously. I was alone and there was no one there." (Mother, 26)

Respect, Dignity, and Equity

Survey measures of respect, dignity and equity were limited to perceptions about health worker politeness and out-of-pocket payments (used as a proxy for equity). Based on their last experience of accessing health care, women reported a universally high degree of health worker politeness (95%) (Table 7.4). Eighty-eight percent of respondents did not have to make any out-of-pocket payments for care (excluding transportation and

food), but there was statistical evidence that they were more likely to have to make payments at health centres (21%) and hospitals (20%) than at dispensaries (9%) (p<0.005).

Table 7.4 Respect, dignity, and equity: user-reported politeness of provider and out-of-pocket payments

Health workers polite			
	n/N	*%*	95% CI
All women	1271/1338	95	94–96
Level of Facility Accessed			
Dispensary	932/983	95	94–96
Health Centre	158/162	98	94–99
Hospital	181/193	94	88–97
No out-of-pocket payment (other than for food or transport) was made			
	n/N	*%*	95% CI
All women	1174/1338	88	86–90
Level of facility accessed			
Dispensary	892/983	91	89–92
Health Centre	128/162	79	69–86
Hospital	154/193	80	70–87

Again, the results from qualitative data contrasted those of the survey. Much of the discussion around respectful or dignified care in in-depth interviews and birth narratives centred on the instances of harassment or abuse that women reported during their care.

"[The health facility staff] don't have good language. I don't know whether it's because of being tired or it is their behaviour, for example, during delivery one is tired and cannot do anything, but they become furious and abusive, accusing us that we are lazy." (Mother, 36)

On the note of equity, care should be affordable to individuals in the catchment area of a facility. According to national policy in Tanzania, services and medications for pregnant women and children under-five are free of charge, yet many women reported that health staff had recommended they purchase items, which reflected particularly badly on perceived quality. It was acknowledged that, if the family lacked the capacity to buy what was needed, the client would simply suffer and would not be treated as she should be. With the need to make out-of-pocket payments, care may be inequitable, with some clients being precluded from care due to financial constraints.

"I hate when you go to the facility to get drugs, rather, you will be asked to buy drugs in a certain shop. They said children get drugs for free, so why are we buying drugs?" (Mother, 27)

"If you don't have means, you just accept the situation, and if you don't have money to buy drugs you just leave [without receiving services]." (Mother, 26)

Emotional Support

Overall, survey respondents found staff helpful, with 91% reporting positively on this measure. There appeared to be no differences based on the level of facility that was accessed (data not shown).

Qualitative data also highlighted some positive interactions between staff and clients. Those in which staff were gentle or spoke very kindly to clients were remembered and definitely contributed to a feeling that care was good.

"One [nurse] came and said if I am feeling well [then I should go]. The other nurse said, 'you should love her, since she has given birth to a woman and not just a baby, so let her rest a little' because I had come from giving birth." (Mother, 41)

"[The nurse] cared for me a lot. I had no [food] … she went out of the gate to call [my mother] to come and give me [food] and then she brought me [food] where I was." (Mother, 19)

Negative interactions were also reported, including a sense that staff generally did not care about clients or have a "heart" for the work that they were doing was raised by a number of participants.

"Frankly speaking, the nurses whom we have, they don't have that good heart, first of all they give too much harassment. When you go to the facility, they don't care about you. You may reach there and find them sleeping. You knock on the door, they cannot respond, they can come at their own time, and once she comes she will use harsh words. To be honest we do not have nurse who we think can help us." (Father, 60)

Quantitative and Qualitative Findings Compared

Table 7.5 highlights some of the key findings from both quantitative and qualitative data collection methods, as organised around the four domains: (1) contact with human and physical resources, (2) cognition, (3) respect, dignity, and equity, and (4) emotional support.

Table 7.5 Comparison of learnings about perceived quality of care using quantitative versus qualitative methods

Dimension of perceived quality of care	Learnings from quantitative data	Learnings from qualitative data
Contact with human and physical resources	Overall, 93% of respondents felt confident that staff would be present, and only 61% felt confident that required drugs and equipment would be present 30% of respondents reported difficulty accessing drinking water, which was particularly true at hospitals (40%)	Frustration at a lack of staff was expressed predominantly by participants seeking care from dispensaries. There was also a widespread sense that drugs and equipment could not be reliably found and would have to be purchased Generally, participants had a good sense of what services they should be receiving, and if those expectations were met, they were satisfied. More than half of participants reported that services rendered met their expectations, despite a third of these participants also commenting on being ignored or harassed Only respondents who were accessing hospitals commented on lack of water
Cognition	91% of respondents found health facility staff to be helpful, and 88% felt that they understood their diagnosis and treatment, however, only 51% of respondents felt they had enough time to ask questions	Almost half of the participants spoke of specific instances in which they were ignored, a procedure was carried out without them being given any information, or that they had asked for information and were dismissed
Respect, dignity, and equity	95% of respondents felt that health facility staff were polite and that they were listened to by	Half of the participants mentioned the harassment and disrespect of clients, many

	health facility staff. Respondents aged 13–19 were also more likely to report that provider attitudes were a barrier to seeking care (41%), compared to 23% of women aged 30–39 and 30% of women aged 40–49 (results not shown above)	elaborating on examples of abuse to them or their spouse. Women giving birth in the hospital in particular mentioned that they had laboured almost entirely on their own, with a health worker providing assistance as the baby was almost fully—or was fully—out
	12% of respondents had to pay out-of-pocket for care, which was higher in health centres (21%) and hospitals (20%). Overall, 60% of these respondents paid an amount they were expecting, with 49% of those receiving care from a hospital and 53% of those receiving care from a health centre paying an unanticipated amount, compared to only 31% of those accessing care at a dispensary	Many respondents indicated that they accrued many unexpected expenses and stressed the unfairness they felt in having to pay anything at all
Emotional support	Overall, 91% of respondents felt that the facility staff were helpful.	Almost all women who delivered at a health facility described being with only a health facility staff during delivery, with their social support allowed to see them after Among participants who did not report harassment or being ignored, some specifically indicated when staff had been particularly kind or gentle with them or their partners

Discussion

According to quantitative data, a sense that drugs and equipment may not be available, that women were not given enough time to ask questions, that water was not always readily accessible and that unexpected out-of-pocket payments were occurring, especially at higher-level facilities seemed to predominate where quality of care was perceived negatively. However, the overwhelming majority of respondents reported positively on measures of provider attitudes including staff politeness, staff helpfulness, staff listening carefully, and that information relayed was understood. Qualitative data reflected these findings regarding lack of confidence in available drugs and equipment, the need for out-of-pocket payments, and difficulty accessing water. However, qualitative data diverged on staff attitudes suggest fewer interactions with staff in which they were polite, helpful, there was sufficient opportunity to ask questions, and that care was understood. Reports of being ignored, being harassed, and being treated disrespectfully were common. As such, as has been found in other low-income country settings, not only were the lack of availability of drugs, equipment and staff and out-of-pocket payments key measures of negative quality of care, but, poor client-provider interactions were as well.(16, 18, 45, 60, 61)

While there are some instances in which quantitative methods and qualitative methods converge around similar findings, there are others where quantitative methods appear to be less good at accessing true measures of client experience, particularly around provider-client interactions. As indicated in Table 7.4, survey responses around politeness (95% positive), helpfulness (91% positive), listening (95% positive), and understanding care (88% positive) had very homogenous responses using quantitative methods. Similar findings have been echoed in other low-income country settings.(23, 57, 62, 63) However, 46% of participants in in-depth interviews and birth narratives highlighted harassing or disrespectful care and 38% reported being ignored or having their queries dismissed. Likewise, in other settings, negative reports of quality of maternal or newborn care seem to be largely derived from qualitative methods.(16-18) A lack of clear benchmarking—what is "quality"? What is "clean"? Compared to what?—within quantitative surveys may explain more homogenous results. Furthermore, a recent review of determinants of user satisfaction in maternal health suggested that very high satisfaction ratings by women might reflect a lack of awareness and exposure, especially among women in low-income country settings.(64) It is clear

that more heterogeneity around these concepts is revealed when using qualitative methods.

An important consideration is that there may also be a very different relationship between participants and survey enumerators than with qualitative interviewers. The former may be perceived as more closely linked to the government or to health facilities directly, which may lead participants to censor their responses. However, within in-depth interviews or birth narratives, as were used in this study, developing trust and openness with the participant to the greatest extent possible is essential. As such, the interaction with the enumerator or interviewer may be markedly different depending on how data are being collected, which may also influence responses.

There are simply some dimensions of the client experience that large-scale survey methods cannot justifiably address. From the framework that we used to organise our findings, "emotional support" encompasses concepts such as self-esteem and control, and staff awareness of their supportive role. Such concepts are difficult to assess and likely require dedicated, specialised instruments that have been adjusted for a given context rather than standard population-level survey approaches.

However, quantitative methods are sometimes needed when population-level measures for perceived quality of care are required. Unlike qualitative research methods, an advantage is the ability to apply quantitative research methods on a large scale. There are, of course, well-documented ways to use mixed methods to draw on the strengths of each, possibly using qualitative methods to provide formative research that can inform the creation of context-specific quantitative tools that optimally measure what they set out to, or using qualitative research to explore and elaborate on quantitative research findings.[59, 65, 66] Others have used this approach in measuring perceived quality of care with success.[44-47] However, the use of such mixed approaches to explore user perspectives within the confines of maternal and newborn care, particularly in a Sub-Saharan African context, is limited.

Limitations
Although attempts were made to align the continuous survey with a Tanzanian context, a lack of these examples meant that data from surveys in other low-income country settings were used to inform the development of the survey module on perceived quality

of care. Additionally, some quantitative measures relied on proxy indicators, for example, out-of-pocket payments as an indicator of equity. Using qualitative methods, the majority of data come from birth narratives, in which mothers and fathers were given much more flexibility to discuss what mattered most to them in their care, and were not necessarily guided to speak to the same measures of quality of care that the survey addressed. As such, there may appear to be greater disparities between these two methods than if they were designed to be more closely aligned.

Conclusion

There are benefits to both quantitative and qualitative research methods when assessing perceived quality of care. Population-level estimates that can only be achieved through quantitative methods may be of more value to policymakers. However, these methods require a priori assumptions about what constitutes quality of care, and when relying on literature or experiences from other settings, measures may not be as transferrable as required, and may even be misleading. Qualitative research methods are time-consuming and can be resource-intensive, and although generating transferrable results, cannot produce the generalisability that researchers and policymakers often desire. Using mixed methodologies to evaluate perceived care may produce valuable population-level estimates with rich description and nuance. Given interest in accurately capturing the user experience of maternal and newborn health services, where such mixed measures are rarely used, may prove valuable.

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Chapter 8

Discussion

This chapter summarises the key results presented throughout this thesis, with a summary of findings presented around the process evaluation framework. Comparisons to findings from other settings are drawn and contributions to the literature are highlighted. Community participation is discussed around the concept of empowerment and some ethical implications and critiques of community-based interventions are explored. This work is situated within the context of health systems strengthening as a whole, with an emphasis on people-centredness and primary health care. Finally, limitations and strengths of this research are explored in greater detail than those previously introduced in results chapters, and important next steps for future research including implications for policy are indicated.

Summary of Key Findings

A critical review of the literature has indicated increased use of quality improvement in Sub-Saharan Africa, including at the community-level, despite a dearth of detailed information about implementation. The data in this thesis go some way towards filling this gap by providing process documentation of the implementation of community-level quality improvement conducted *for* community members, *by* community members. The insights presented throughout this thesis are summarised below around the research questions that have been defined.

1. **To what extent was the intervention implemented as planned?**

   Table 8.1 below highlights some of the key learnings about the implementation of community-level quality improvement structured around the process evaluation framework.

Table 8.1 Summary of key findings of the mixed methods process evaluation of community-level quality improvement

Process Evaluation Component	Key Findings
1. Fidelity: the extent to which community-level quality improvement was carried out as planned	At the crux of this intervention was that change ideas were created and implemented by volunteers, reflecting local needs. Volunteers did appear to establish change ideas that they felt would be the most effective in their communities (Chapter 4). Volunteers widely expressed a sense of responsibility and influence over much of the quality improvement activities, although volunteers in lower-performing villages seemed to view EQUIP more so as a set of prescribed activities to carry out in their communities (chapters 4 and 5). Volunteers readily acknowledged the importance of being from the communities where they were active, and all volunteers had been in their communities for a considerable length of time, often being born there (chapters 4 and 5).
2. Completeness: the number and type of activities	There were notable delays between learning sessions and it was not until later in the course of the intervention that more close supervision in each village was actually implemented.

	being carried out at the community-level	Consequently, there were gaps in terms of training and mentoring and coaching (Chapter 3). Most volunteers did appear to be at least somewhat active each month and documented their activities regularly. Volunteer attendance at learning sessions was very high, always with 90% or more of villages represented. Learning session attendance was perfect among the four villages included in the process evaluation (Chapter 4, Appendix 2). Monthly reporting was also done regularly and plotting of data onto run charts, although not always correctly done, was carried out at monthly meetings (chapters 3 and 5). Monthly meetings were not always consistently held, but were offered according to need and at least one volunteer from each of the four villages attended these (Chapter 4, Appendix 2).
3.	Exposure: the extent to which intervention participants (village volunteers and extension workers) and targets (recently delivered women and their partners) actively engage with or are receptive to the intervention	Among the four villages within the process evaluation, village volunteers and extension workers readily engaged with the intervention and had high levels of participation, as evidence by regular attendance of learning sessions and meetings, close follow-up through mentoring and coaching, and regular village-level activities (Chapter 3). Volunteers and extension workers expressed high levels of receptiveness to the intervention, noting its perceived importance to their communities and to them personally (Chapter 5). Recently delivered mothers and their partners were not always clear on the exact role of EQUIP volunteers and sometimes confused them with other community-based volunteers carrying out similar functions. However, households were receptive to the messaging or activities of volunteers and many women especially were able to identify how their interaction with volunteers had been informative and helpful (Chapter 5).
4.	Reach: the proportion of intended targets actually	It was not possible to determine accurate denominators (for example, the total number of pregnant women, or the total number of women who gave birth each month) in each community, as some women may not have been identified as

receiving the intervention	pregnant and not all births may have been successfully recorded by volunteers. As women might go to any facility to give birth, there was no way for volunteers to accurately verify the number of women giving birth each month by looking at local facility maternity registers to calculate their coverage. Furthermore, volunteers were typically doing two or three home visits per pregnant woman (as home visits was a strategy used by volunteers in all four villages). These were done to provide education and to ensure that birth preparedness was completed, or to follow-up on place of delivery after birth. Based on number of recorded visits and whether or not follow-up was done after birth, it was possible to generate a crude estimate of coverage. Therefore, based only on volunteer data—which is limited—it was found that, of the four villages in which the process evaluation was carried out, from November 2012 until November 2013, coverage in Village A was greater than 95%, in Villages B and C, coverage was approximately 90%, and in Village D, coverage was approximately 65% (Chapter 4).
5. Satisfaction: participant (village volunteers and extension workers) and target (recently delivered women and their partners) satisfaction with the intervention	Both implementers and targets reported a high level of satisfaction with the EQUIP intervention. Implementers recognised the value in the programme in terms of benefits to mothers and newborns and appreciated the knowledge and skills they had acquired and perceived that they had increasing importance or status in their communities. However, volunteers widely suggested that allowances should increase, that sometimes the quality improvement methodologies were difficult to understand and use, and that transportation problems within their village made it difficult to reach all pregnant women if they needed to (Chapter 5).

Barring the expense of transportation, which was not always effectively reimbursed, extension workers were very satisfied with their roles. Both appreciated the gains made by the volunteers in terms of their knowledge and capacity to do |

	quality improvement and recognised their role in accomplishing those. Both extension workers noted benefits to themselves, namely in knowledge of quality improvement and also in managerial skills (Chapter 5).
	Finally, community members appreciated the EQUIP intervention and valued the education that they very often received as part of volunteers' change ideas. However, some were under the false impression that volunteers were paid or felt that volunteers should give them equipment needed for birth rather than asking them to prepare it (Chapter 5).
6. Recruitment: procedures used to attract and sustain volunteers and extension workers	Volunteers did not apply for the volunteer positions within EQUIP but were recruited by community members—either village leaders or through a more public process. Volunteers were satisfied with the recruitment process and felt a sense of pride that they were selected. Most volunteers also expressed a sense of responsibility to be active within EQUIP because their community had selected them (Chapter 5). Extension workers either had the opportunity to express interest in the positions or were recruited based on recommendation from their employers. Both extension workers in this study also reported being satisfied with this process (Chapter 5).
7. Context: aspects of the environment that may influence the implementation of the intervention or study outcomes	There were other community-based maternal and newborn health interventions being carried out at the community level that emphasised similar messaging to what EQUIP volunteers shared (chapters 3 and 4). Health facility staff made efforts to engage male partners of pregnant women, especially in antenatal care. Likewise, EQUIP volunteers encouraged male involvement in pregnancy and childbirth (chapters 3 and 6). At the national level, the government was also strongly

	encouraging birth preparedness and health facility delivery, often through radio messaging and as reflected in focussed antenatal care policies used by providers (chapters 3 and 6).
	Overall, increasing socioeconomic development in Mtwara due to the oil and gas industry may have contributed to improved infrastructure, which may have had implications for improved accessibility to health services.
	Broader changes such as government initiatives to build more health facilities and the increasing availability of motorcycles also appeared to contribute to increased accessibility of health services (Chapter 6).

In general, the intervention was implemented as planned. As described in Chapter 3, the cascade of supervision enabled close follow-up of volunteers by extension workers, who had close links with the community-level quality improvement district mentor and EQUIP staff. This system of supervision was helpful, as regular mentoring and coaching of volunteers was required to ensure that they had sufficient capacity to use quality improvement. In terms of quality improvement methodologies, village volunteers were able to use brainstorming to uproot the most pressing problems in their communities linked to the change topics, they could use PDSA cycles, and the majority could both plot and interpret run charts used to determine whether improvements were being made. However, these capacities took time to build, and many volunteers relied on one another for support, especially in plotting and analysing data (chapters 3 and 5). Interaction between health facility staff and volunteers was an intended component of EQUIP but had mixed findings, with engagement being much better in some communities than in others. In some cases, health facility staff and volunteers were aware of each other's change ideas and supported their implementation (chapters 3 and 5). In other communities, interaction was limited at best, and hostile at worse, with volunteers feeling rejected by health facility staff (Chapter 5). Implementation gaps were observed around inconsistent or poor collection of data by volunteers, some volunteers *not* regularly

using local data in their quality improvement activities, and, as indicated in Chapter 5, some volunteers leaving the intervention due to insufficient monetary incentives.

2. **What facilitated community-level quality improvement?**

   Chapter 4 indicate the key facilitators of the intervention, uncovered by ranking villages through the use of implementation scores and looking at factors that were especially present in higher-ranking villages, and absent in lower-ranking villages. This method highlighted the importance of village leadership, which further enabled local resource mobilisation (chapters 3, 4, and 5), including the provision of local financial incentives and assistance in transport. Furthermore, village leaders were helpful in promoting village sensitisation and helping volunteers gain access to resistant households (chapters 3, 4, and 5). Regular education was also highlighted as an important facilitator of the intervention. Although the provision of education was the same across all four villages, volunteer turnover in the two lowest-performing villages meant a deficit in knowledge in replacement volunteers and a generally weaker education base in those villages. Volunteers in focus group discussions reiterated the importance of this education and emphasised its application to their own lives. Commitment to the intervention was also enhanced through education, which instilled in volunteers a sense of responsibility to pass on knowledge that they had gained (chapters 4 and 5). Finally, the collection, plotting, and use of local data was empowering for volunteers who regularly engaged in these activities. Not only were volunteers encouraged by a sense of importance due to having a new skill set and responsibility, but improvements seen through data motivated them. Where volunteers did not use local data regularly, they were not able to see potential accomplishments and did not have the same buy-in to the intervention, nor were they able to correctly monitor and evaluate their change ideas.

3. **To what extent do factors influencing community participation-based interventions also influence community-level quality improvement?**

   As community-level quality improvement engaged community members in all aspects of the intervention, from leadership and planning to monitoring and evaluation, there was a high level of local participation. All volunteers, both from the four sampled villages as well as those in focus group discussions, noted that they had gained new knowledge and skills through their participation in EQUIP. This

new knowledge base was thought to be transferrable to aspects of their lives beyond EQUIP. Local management and leadership were part of the intervention's design, and it was important that the extension workers and volunteers were from the communities in which they were active. Although some volunteers felt that, with adequate training, anyone would do quality improvement in their communities, most were of the opinion that their local insights were critical to the success of their change ideas. Local needs assessment, therefore, was enabled through the contextual knowledge that each pair of volunteers had of their communities. When asked about barriers to care-seeking or to making birth preparations, volunteers tended to echo the same barriers expressed by women and men from their communities who were participants in this research. Both volunteers and community members identified financial barriers or transportation difficulties and lack of engagement of men as key barriers to those practices. Local design and implementation and monitoring and evaluation stemmed from volunteers' autonomy over their change ideas. Volunteers regularly reported that they could implement and monitor and evaluate their change ideas. Perspectives around the design of change ideas, however, seemed to differ, with the higher-performing villages, as identified in Chapter 4, having a greater sense of responsibility and control over change idea generation. In the first round of data collection from volunteers, those in lower-performing villages also expressed having authority over change idea creation. However, in the second round of data collection near the end of the second year of the intervention, volunteers in lower-performing villages described change ideas as something they were assigned to implement, rather than something they had created themselves. Finally, the design of change ideas also seemed to tie into concepts of ownership. Volunteers in higher-performing villages expressed a high level of ownership of the intervention, while those in lower-performing villages did not. Taken together, these factors all influenced the implementation of community-level quality improvement. In similar interventions they should, ideally, all be supported in order to enable community-level quality improvement to be implemented fully with the greatest amount of success.

4. **Can community-level quality improvement influence birth preparedness and place of delivery?**

Although both birth preparedness and childbirth in a health facility were encouraged through the change ideas of volunteers, there were a myriad of other factors

affecting these practices. Many of these factors reflected broader social changes, such as increased involvement of men in pregnancy and childbirth, better education for parents from multiple sources—including EQUIP volunteers—generally increased acceptance of both practices, and better availability of transportation and health facilities. The influence of contextual factors is discussed in greater detail in *Reflections on Findings* below.

5. **What can be learned about user-perceived quality of care from quantitative versus qualitative research methods?**

People-centredness is an important component of primary health care and one that was supported through EQUIP, particularly through the inclusion of the community in quality improvement. Providing a platform from which users of health services can be heard is an important aspect of people-centredness. For the findings here to be of value to other maternal and newborn health interventions, both involving quality improvement and beyond, that platform needs to extend into academic and decision-making spheres. Therefore, finding better ways to measure and articulate the user experience of maternal and newborn health is important. As per the findings presented in Table 7.5 in Chapter 7, both qualitative and quantitative methods converged around perceptions about drug, equipment, and staff availability. Structural information such as the availability of water was also reflected similarly by both methods. Quantitative measures may have produced unrealistically positive and homogeneous results around quality, particularly with reference to client-provider interactions. Qualitative measures better highlighted both positive and negative interactions between clients and providers, allowing for greater explanations of these. There are advantages and disadvantages to both methods. Use of qualitative methods to both inform and explain quantitative survey findings may provide data that is of greatest use in influencing decision-making around maternal and newborn care.

When viewed together, findings around increased care-seeking for maternal and newborn health (chapters 3 and 6) alongside suggestions that quality of care needs to improve (Chapter 7) emphasises the need for improved quality of maternal and newborn health services, especially in light of increasing demand for care.

Reflections on Findings

For the intervention to be implemented as planned, it was necessary that it be as participatory as possible. Zakus and Lysack identified some of the predisposing conditions necessary for community participation. Among these conditions are: a political climate of openness to community participation; decentralised government policies; health services accountability through community participation; past experiences with community participation; and shared longer-term goals.(1) Tanzania has a longstanding history of community engagement in health, from the presence of village or community health workers, community participation on Health Facility Governing Committees or Council Health Services Boards, or through various community-based initiatives headed by non-governmental or academic organisations.(2-11) Given this persistent community engagement, it is not surprising that an intervention like community-level quality improvement would be well-received in Tandahimba. Village leaders are also accustomed to working with community members on health. In villages where leaders provided allowances to EQUIP volunteers from the village itself (Chapter 4), they were often already doing so for other community-based volunteers, suggesting that there is a high degree of receptiveness from village leaders to this type of engagement.

Although community-level quality improvement within EQUIP was possible and appreciated, helping to develop skills and capacities among village volunteers, there is limited evidence of its impact on outcomes related to maternal and newborn health. There was evidence of increased preparation of clean delivery kits—"birth preparedness"—in homebirths. From baseline-to-endline, the percentage of women with a home birth who prepared for birth increased from 15% to 62% in Tandahimba and remained at 23% in the comparison district Newala, for a difference-in-difference of 31% (95% CI 2–60). However, the evidence for improved facility deliveries was weak, In Tandahimba district, from baseline-to-endline of the EQUIP project (inclusive of a final round of data collection not shown in Chapter 6), facility deliveries increased from 55–87% and in Newala from 62–78%, for a difference-in-difference of 7% (95% CI -7–21) (Table 1.1).(12) Given that increases in health facility delivery were seen in the comparison district, and there was a non-significant difference-in-difference between the two districts, it is likely that there were influences on these behaviours beyond EQUIP. These broader factors have been suggested in Chapter 3 and Table 8.1 above, including greater emphasis on birth preparedness and facility delivery through other

community-based initiatives (see Chapter 1) or by healthcare providers during antenatal care, greater involvement of men in pregnancy and childbirth, and national-level campaigns stressing the importance of health facility delivery. In addition, the notable socioeconomic development of Mtwara region due to the oil and gas industry, especially around Mtwara Town, may have implications for health services. Some developments include: the establishment of a local university, which might lead to more trained health facility staff in the region; increased local employment; greater monetary support for local businesses, especially in hospitality, with an influx of expatriate and other migrant workers; demands for consistent electricity supply from oil and gas companies, which may improve electricity supply more generally; investments in road networks have been made, which may improve access to health facilities; and the building of health facilities directly by oil companies, which serves to improve the supply of health services in this region. However, the civil unrest mentioned briefly in Chapter 2 may also contribute to disruptions in the provision of care to people in and around Mtwara Town. Future work in this region must clearly document these progressions to understand the extent to which socioeconomic development may be improving or impeding health outcomes vis-à-vis other interventions.

This intervention was situated within a specific context, and its implementation and outcomes are, to an extent, a reflection of that context. Although the process documented throughout this thesis may be used to inform similar interventions in the future, the importance of context cannot be understated and will be critical to the success of any future interventions.

Comparison with Other Findings

Results from chapters 3, 4, 6, and 7 already highlighted comparisons of our findings across available literature and will not be repeated here. However, it is possible to draw comparisons across some of the findings from Chapter 5 as well as broader level findings throughout this thesis and as per Table 8.1. These comparisons come from health facility- or community-level quality improvement initiatives in Sub-Saharan Africa.

There were a number of findings around the implementation of EQUIP and its processes that were echoed elsewhere. The importance of learning sessions and monthly meetings

within EQUIP, particularly with regards to peer exchanges and mentoring and coaching, has been reported elsewhere.(13-15) However, also as in EQUIP, longer-than-anticipated delays between learning sessions were a problem in a Ghanaian quality improvement intervention called Project Fives Alive! led by health facility staff across the country with the aim of reducing deaths in children under-five.(16) The development of valuable knowledge and skills and building capacity to do quality improvement by first-time participants has also been reported across multiple settings, as in EQUIP.(13, 16-21) The appreciation expressed by EQUIP volunteers around learning to use quality improvement methodologies, including problem solving techniques, was also highlighted in an example from Uganda in which health providers used quality improvement to reduce maternal and newborn deaths.(17)

As in EQUIP, problems with the quality of locally-collected data or delays in providing feedback, particularly for monitoring and evaluation, were reported in Project Fives Alive! and another intervention engaging health facility staff in quality improvement to increase coverage of patients on highly active antiretroviral medications.(16, 22) However, where used routinely, the motivating influence of local data in promoting quality improvement activities and fostering buy-in was also an important facilitator of a health facility staff-led intervention to improve primary care services at health facilities in Rwanda and a community-led quality improvement intervention aimed at increasing community health worker performance in Ethiopia.(18, 21) Finally, a perceived increase in the commitment to the health of mothers and newborns through quality improvement activities also occurred in the Ethiopian intervention, which was frequently stated as a primary motivation of EQUIP volunteers.(21)

In addition to these findings, authors have written about perceptions of volunteerism and incentives and motivation for volunteering in other Sub-Saharan African contexts. Patel suggests that the concepts of civil service and volunteering have close ties to African values of mutual aid and community support.(23) She notes that it is important to appreciate that many volunteers or civic servants in the context of Sub-Saharan Africa are likely to have a similar socioeconomic status to their beneficiaries, unlike the situation in many high-income country settings. As observed in EQUIP, Patel found that perceptions of volunteerism in a South African setting surrounded the provision of benefits to individuals, families, communities, and wider society, ultimately contributing to national development goals.(23) Also as in EQUIP, a clearly shared

perception from an additional study on the characteristics of volunteers in South Africa was the notion that a distinguishing feature of volunteers was giving of oneself with no expectation of payment.(24) Like EQUIP volunteers, volunteers in both South African studies felt a strong sense of responsibility for their roles.(23, 24)

Unlike in EQUIP, a study on willingness to volunteer in Nigeria within a programme supporting community management of malaria found that most (67%) volunteers felt volunteering was an important part of religious activities.(25) A similar view—doing volunteer work to please God—was found in an Ethiopian study engaging volunteers in the distribution of HIV medication.(26)

A pre-existing history of community participation tended to predict participation in EQUIP. More than half of the volunteers in the Nigerian study had previously been in a volunteer role, similar to what we saw in EQUIP, but interference with income-generating activities was seen as a barrier to volunteering.(25) Although in EQUIP volunteers expressed how they managed their time to balance both personal and EQUIP activities, they did state that some volunteers left the project due to unfulfilled expectations of payment.

In both the Nigerian and Ethiopian studies, volunteers felt that their participation would assist them in securing a future role in another community programme, and this was also observed in EQUIP.(25, 26) Similarly, a study of participatory development in southern Tanzania found that community members who had participated in development projects had largely poor views of these, seeing them as paternalistic and offering little benefit to them. However, where projects were viewed positively was when they were perceived to offer opportunities for individual advancement.(27) Social respect and a sense of satisfaction were also expressed as motivation to do volunteer work in the Ethiopian study.(26) The same is true of the EQUIP intervention, where additional motivating factors included extrinsic incentives such as gains in reputation and community appreciation as well as recognition from health facilities.

Community Participation in Health Interventions

Community Participation in Health and Empowerment
Considering again Arnstein's ladder of participation,(28) or Rifkin's continuum of participation,(29) it was suggested in the introduction that the community-level quality

improvement within EQUIP would have a level of participation near the top of both of these. However, both suggest a high level of responsibility and ownership from community members; effectively, that communities should be empowered through community participation in health.

There is much to be said about the divide between rhetoric and reality when it comes to community participation. This divide may refer not only to the assumptions that are embedded in its pursuit, but also in the implicit understanding that it will inevitably lead to community empowerment.(27, 30, 31) In Chapter 1, the distinction between whether community participation is seen as a means or an end was highlighted. As a means, participation is typically understood as a utilitarian process in which, usually through collaboration with an external party, there are efforts to use community resources to affect changes in health. As an end, community participation is seen as a process of empowerment, in which locals diagnose and work to solve their own problems.(27, 30-34)

It has been widely demonstrated that the associations between community participation in health and empowerment are not well studied, and are suggested to have occurred with little evidence of such.(27, 29, 30, 35) The most vulnerable and marginalised members of society may lack the capacity to bring about social transformation without the structures established by external facilitators.(27, 36) Access to knowledge with a failure to address broader socio-political and economic rules and resources will not facilitate change.(27, 32, 37) In addition, many of the problems that community members face—especially the most poor and vulnerable—simply cannot be tackled at the local level.(38) Even high-capacity and extremely motivated community members will be constrained by resource availability.(30)

Within EQUIP's community-level quality improvement, as described in Chapter 5 and below within the context of health systems strengthening, there was some evidence of empowering processes. Primarily, that village volunteers felt that they could interact with health facility staff, not only about matters related to their respective quality improvement work, but about staff and facility performance. Their sense that they could assert influence over an institution (health facilities) that directly affects the health and wellbeing of their community —whether that stemmed from their engagement with EQUIP or not—suggests a sense of empowerment. However, it is important to reflect

on the levels from which empowerment can manifest, and within the scope of community participation in health that is often assumed to be at the level of the community, not simply of the individual. As such, it is likely that the empowering effect of the EQUIP intervention was limited only to a selection of volunteers, with no indications of community-wide empowerment. Therefore, although community-level quality improvement lies near the top of Arnstein's ladder or Rifkin's continuum, it did not achieve the responsibility, ownership, and ultimately empowerment of the community that would be expected.

Critiques of Community Participation in Health

Although largely very positive, there are some important critiques to be made of community participation within the context of EQUIP. As briefly introduced in Chapters 3 and 5, there are a number of ethical issues that may arise within community-based interventions. As power within an intervention moves away from external sources and into communities, the extent to which community autonomy needs to be upheld may be questioned. Indeed, facilitators of a community participation-based project may find themselves engaged in programming believed to be at best ill advised and at worst, actually harmful.(39) Such would be the case in EQUIP when considering the widespread use of fines against mothers giving birth at home or to the traditional birth attendants assisting them.

Perhaps the most widely known critique of community participation is "Participation: the New Tyranny" edited by Cooke and Kothari. The contributors suggest that participation does not function according to its theory, and rather than redistribute power, it in fact reinforces existing relationships. However, the effect on power relationships seems to be left unexplored and the use of community participation in health interventions widespread.(40) To fully grasp the power dynamics at play and to understand the impact participation may or may not be having on them, Williams suggests three questions be asked: 1. To what extent do participatory programmes contribute to processes of political learning among the poor? 2. To what degree do participatory programmes reshape political networks? 3. How do participatory programmes affect existing patterns of political representation, including changes to the language of political claims and competition?(41)(pg. 568) Such ethical concerns may have been present within EQUIP. The power dynamics in the communities of study were not well understood, and it was not clear the extent to which destructive or

harmful social roles were being supported through the power bestowed on volunteers by the intervention. Again, the implementation of fines, despite being previously retracted in some villages following the disapproval of community members, may reflect the power given to volunteers through EQUIP. Furthermore, ethical issues around confidentiality and giving certain groups access to other groups' personal information can also serve to potentially reinforce negative power dynamics. Within EQUIP, volunteers had access to confidential data around antenatal care, birth outcomes, and postnatal care that they previously would not have had access to.

Another concern of community participation in health interventions is its tendency to focus too closely on local processes. Local changes that may arise through participation might actually be met with resistance at the district level. As such, there is a need for integration of community participation into district-level systems. For sustainability, participation must go beyond the community-level and individual involvement in health activities.(31, 42) Likewise, if community members begin to rally behind changes that they cannot manifest themselves, support from higher levels is likely to be needed. Although quality improvement inherently targets local processes, models like EQUIP, which seek to link communities within the broader health system infrastructure may help to overcome some of these constraints. For example, the interaction between health facility staff and community members engaged in quality improvement helped to facilitate successful implementation of change ideas at both levels (Chapter 3). Having district-level staff also participating in quality improvement and helping to supervise facility-level teams, further extended the cascade from community-to-district.

Health Systems Strengthening from the Bottom-Up
Boundaries of health systems are difficult to define, with multiple suggestions based on financing, provision, politico-economic perspectives, and others.(43) Taking the view that health systems encompass the activities that directly or indirectly affect health, community-based initiatives such as EQUIP that aimed to encourage health-seeking and improve household-level practices for maternal and newborn health could certainly fall within the Tanzanian health system. Furthermore, although not always functional, community health workers and community-based initiatives have had a persistent presence in Tanzania, and the importance of community participation in health continues to be stressed in national policy.(2, 4-7, 9, 44) As seen in Chapter 5, volunteers often had a pre-existing history of community participation, and it is

reasonable to assume that they would continue with other community engagement after EQUIP. In Tanzania, the government's Primary Health Services Development Programme 2007–2017 aims to develop the "knowledge and skills leading to community empowerment for health improvement".(4)(pg. 8) In this respect, initiatives like EQUIP directly contribute to this aim. Additionally, by strengthening their capacities, volunteers may be more effective in similar or other activities that they may be a part of in the future.

EQUIP volunteers and extension workers stated that they had increased their knowledge and skills in maternal and newborn health, in quality improvement, and in community engagement. Many suggested that they would draw upon what they had learned in their own lives, within their families (Chapter 5). As such, informal strengthening of household and community capacity around maternal and newborn health may have resulted from the EQUIP intervention.

Finally, there is an increasing interest in people-centredness in health care.(45-47) People-centredness recognises that health systems are complex and dynamic and that people engage with the health system as users, providers, and decision-makers. People-centredness aims to provide platforms from which interests can be expressed, so that change can occur across the levels within a health system, brought about by different groups of people.(45) In this respect, an important contribution of the EQUIP intervention to health systems strengthening was the bringing together of community volunteers and health facility staff, providing a platform for meaningful exchanges around improving quality and the health of mothers and newborns. Complex, multi-level interventions like EQUIP with a strong community component may play an important role in encouraging people-centredness. As a quality improvement intervention, Chapter 7 highlighted some of measurement issues regarding perceived quality of care, which is of importance as the agenda for maternal and newborn health advances to better reflect the user experience. As such, both the implementation and study of interventions such as community-level quality improvement may have important implications for people-centredness in primary health care.

Study Limitations

With regards to the selection of villages, exclusion criteria restricted potential villages to only those that had been among the first to implement the intervention. This criterion was set to get the best sense of the intervention in-practice, with the understanding that the initial stages of learning would take some time. There is little documentation of the very initial stages of the intervention, in which the learning curve would be steep and the volunteer's initial impressions and work with quality improvement methodologies could be explored. Likewise, this research only considered the second year of the intervention. Therefore, the final year of the intervention, in which teams were likely to have the highest level of capacity, was not captured in the data presented here. Restriction to earlier starters invariably restricted the intervention to only one division (Mahuta) of the three in Tandahimba district. The other two (Litehu and Namikupa) were contextually different and the intervention in these settings may have experienced different facilitators and barriers to implementation.

Determining measures within the process evaluation such as exposure and reach were very difficult, owing to poor quality and inconsistently collected programme data. Volunteer counterbooks in which their data were stored were often poorly organised, and tracking down and making sense of their monthly activities was a challenge.

As the majority of primary data were qualitative, a major limitation of this study is the reliance on Swahili-English-speaking research assistants rather than collecting all qualitative data myself. Although in some instances it was likely beneficial for Tanzanian women to be conducting in-depth interviews or birth narratives (as seemed to be the case for recently delivered women) it is advantageous to be as close to qualitative data as possible. My interpretation of the data was reliant on the quality of transcription and translation and it is possible that some concepts may have been lost. Furthermore, as indicated in Chapter 2, given my strong biomedical background, I default to more positivist thinking, which certainly has implications for the interpretation of qualitative data. I tried to remain reflexive throughout, open to the co-construction of data between the participants and myself.

Study Strengths

This study captured not only the experience of implementers (volunteers and extension

workers) of the intervention, but of its targets (recently delivered women and their partners) as well. Having male perspectives in particular helped to ascertain how a community-based initiative—as reported in its theoretical benefits as well—is close enough to community interests to influence social norms like the involvement of men in pregnancy and childbirth.

Although data were only collected from one year of the intervention, revisiting volunteers and extension workers allowed for a basic tracking of some changes in their capacity to use quality improvement over time, as well as contextual changes within villages.

Measures to ensure data quality were taken throughout the data collection and analysis periods. There were careful checks on transcript and translation quality, immediate debriefing of all interviews, regular check-ins with research assistants around reflexivity, and confirmation of interpretation of results with EQUIP staff, the district community-level quality improvement mentor, the extension workers and volunteers who participated, some health facility staff, and some village executive officers.

To my knowledge, this research represents one of only two studies that explored process within a community-based quality improvement intervention that targeted community members directly, rather than community health workers or health facility staff. According to available literature, it is the first of its kind in Sub-Saharan Africa.

Suggested Areas of Future Research

Community-Level Quality Improvement in Health
It would be valuable to have more documented evidence on quality improvement processes and outcomes, especially from Sub-Saharan Africa, for the development of future quality improvement interventions. Implementation research around community-level quality improvement should include more explicit and thorough indications not only of the organisation of quality improvement activities, but of the context and experiences of implementers and targets. There is a need to indicate who is participating in community-level quality improvement and to what end—whether activities are being undertaken to address demand- or supply-side factors related to health. Furthermore, as quality improvement relies heavily on developing the capacity of implementers, it would be useful to understand this development over time, such that greater indications

of how much of a "dose" of training or longevity within an intervention is required before capacities are high and the intervention achieves what it set out to do. Finally, it would be of value to explore processes across the entire implementation period. These data could be used to develop a detailed evaluation of community-level quality improvement implementation. Applicable to the study of quality improvement as a whole, robust experimental study designs, rather than before-and-after trials or case studies, for example, would provide more reliable measures of outcomes and impact than are predominantly available. In future, having high-quality implementation and impact data together would provide a stronger evidence base for quality improvement. Such evidence may be useful in providing quality improvement with a platform it is currently lacking among decision-makers in many Sub-Saharan African countries.

This thesis identified aspects of gender within community-level quality improvement. It has been suggested that a lack of gender representation in the literature around participatory development has an impact on how issues of poverty are addressed, especially given female contributions to households and communities.(48) The same could likely be said for community participation in quality improvement. More detailed exploration of gender would be valuable, particularly with a view to improving maternal and newborn health.

Community Participation in Health Interventions

In light of some of the ethical concerns of community participation-based initiatives, it would be worthwhile for future research to explicitly study these. In particular, gaining a greater understanding of who participates and why, especially with a view to understanding their pre-existing power in their communities and how that is affected through participation in a community-based intervention. Therefore, in future, where interventions are community-based, considerations around community dynamics, power, and marginalisation should be made explicit.(49) In addition, if carrying out research on community participation, it would be very important to explore if there are unintended or negative outcomes. Such outcomes may give indications of the reinforcement of such potentially negative power structures. To ascertain if and how these outcomes may be arising, giving voice to vulnerable or marginalised populations—rather than speaking only with implementers, beneficiaries, or community leaders—would be beneficial. Staying close to the study population and trying to

observe communities to the greatest extent possible may also help in identifying such outcomes. Researchers should aim to consistently reflect upon and flag ethical concerns as they are raised. Prior to engaging in a community participation-based intervention, there should be plans made around prematurely stopping an intervention if it appears that negative outcomes are resulting.

Marston et al found a lack of high-quality—particularly qualitative—evidence around community-participation-based interventions in maternal and newborn health.(50, 51) As community participation in health interventions has been given renewed investment in recent years, greater insights into how it may or may not achieve desired outcomes would lead to more purposeful recommendations about how it can be best used. In the future, it would be helpful to see better designed studies where the role of community participation is reported on independently of other aspects of the intervention or programme.(51) Better-designed community-based interventions may then contribute to better health outcomes and health systems strengthening from the bottom-up.

Evaluating if and how community participation-based interventions can engage with vulnerable people would be useful in developing interventions targeted toward these populations. In the case of EQUIP, understanding the extent to which fines against women giving birth at home further reinforced economic vulnerability would have been useful to explore but was not possible within the confines of this work. As vulnerable populations often bear a disproportionate burden of morbidity and mortality, engaging with interventions that can positively and sustainably address issues specific to these populations may be necessary to see marked changes in population health outcomes. Identifying and addressing the problems affecting vulnerable populations may be best addressed through the local insights inherent in community participation-based interventions.

Finally, it would be interesting to make a point of observing many of the assumptions that Rifkin pointed out, namely: that people actually want to participate in activities and take decisions that influence their health care; that providing education or information will lead to behaviour change; and that through empowering processes, the outcomes will be in-line with the expectations of policymakers.(52) Again, this knowledge could be used to better guide proponents of community participation in health toward designing interventions that are more likely to succeed.

Quality of Maternal and Newborn Health Care

In the future, study of quality should, as indicated in Chapter 7, aim to bring together qualitative and quantitative research methods in order to ensure that the complexity and nuance to perceived quality can be addressed and more meaningful reflections can be shared with policymakers and other researchers. An ideal scenario might have qualitative research being used to inform quantitative survey instruments, from which the results can be further explored through qualitative methodologies.

Implications for Policy

In Tanzania, a National Health Quality Improvement Committee was established in 2009. This committee has recognised the potential of quality improvement to strengthen the Tanzanian health system (Personal communication with member). However, the Taskforce lacks a sufficient evidence base in order to make effective recommendations for the districts throughout the country. The results presented in this thesis, and from other studies of EQUIP, will help to contribute to that evidence base. As quality improvement continues to be used in Tanzania, if some of the above suggestions are considered within future research, better data on both implementation and outcomes will be available to inform national-level recommendations.

Conclusion

This thesis explained the implementer and recipient experience of community-level quality improvement and its processes, barriers, and facilitators were analysed and documented. The use of mixed methods was essential to derive important process and qualitative data that were used to populate findings within a process evaluation framework. This framework was a helpful tool that enabled collection of meaningful and informative process data, with room to explore context. The use of implementation scores to measure the relative implementation success among the four villages of the process evaluation provided a more useful measure of facilitators and barriers than qualitative methods alone. The links between community participation and community-level quality improvement were investigated, and the factors influencing these were elaborated on within the context of EQUIP. The effect of community-level quality improvement on process outcomes such as birth preparedness and health facility delivery was explored in the context of other influences and highlighted the contribution

that community-level quality improvement may make to social change. Finally, the importance of understanding users' experience of maternal and newborn care was emphasised as key in improving quality, as interventions like EQUIP aimed to do. Suggestions for better measurement of perceived quality of care were provided, as the agenda to advance understanding of user experiences in maternal and newborn health gains strength. Gaps in service quality in light of increased demand for maternal and newborn health services highlighted the ongoing need for improved quality of care.

In conclusion, this investigation found that community-level quality improvement can build local problem-solving capacity, may contribute to improved health of communities, provides a platform from which users can be given a voice, and ultimately, may help to strengthen primary health care. As there appears to be strong interest in community engagement in health and many modes of doing so, including within the confines of quality improvement, this thesis provides useful information that may have valuable applications elsewhere.

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Appendices

Appendix 1. Quality Improvement Initiatives in Sub-Saharan Africa

Table 1. Summary of quality improvement initiatives in Sub-Saharan Africa 1996–2014

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
1994	Uganda(1)	To improve primary health care services in Uganda	QITs selected clinical or administrative problems to work on and developed work plans to monitor progress in solving these problems. Solutions were developed and applied and results measured. District teams met after six months to compare progress and to generate a new set of problems to work on. After one year, lessons learns were shared. Mentoring was carried out by the Ministry of Health.	Health facility staff	Health facilities	Not explicitly, but considerable mention of implementation	The strengthening of interactions between disease-control programmes, facilitated through monthly QI meetings, was important in seeing achievements at the central level. Visiting the districts was key in helping Ministry staff appreciate the need for integrated district-level services. There were barriers to carrying out regular district-level visits by the Ministry of Health. An important accomplishment of the programme was to bring together district health teams, local administrators, and political leaders around strengthening of health services. The authors also shared many of the key problem areas identified and acted on by teams. Also noted that capacity to do quality improvement varied widely across districts.	At a hospital in Jinja: within the 12 months of QI activity, maternal deaths were reduced from 17 (13.5%) to 8 (2.9%), despite the number of women presenting for obstetrical complications increasing from 126–274. At another facility, after 12 months, delays had been reduced through the reorganisation of patient flow. At another facility, Outpatient services in the last six months of the intervention period increased by almost 50% compared to the first six months.
2002–2006	Kenya(2)	To strengthen the health system and addressed barriers to the timely delivery of quality services and also to resolve local management problems.	Quality assurance teams continuously identified and addressed barriers to the timely delivery of quality services and also to resolve local management problems.	National-level administrators	Health facilities	Not explicitly, but did indicate steps for building a quality assurance team	Steps: 1. Created and organised the national quality assurance team. 2. Trained the national team 3. Worked with institutions at different levels 4. Quality improvement at the facility level, turning "actual practices" into "desired practices" 5. Rolled out training 6. Ran quarterly oversight visits to facilities 7. Had a feedback system at all levels 8. Monitored and evaluated facilities	Example from a case study in Garissa province: Premature discharge of patients dropped by 90% despite an increase in admissions and outpatient attendance. The number of deliveries doubled and the number of caesarean sections nearly tripled. Delays by the emergency response team decreased by 30% and outpatient wait times decreased by 55%.

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2003–2004	Democratic Republic of Congo(3)	To improve quality of care	QITs, supported by the International Committee of the Red Cross, developed categories of primary health care aims. These aims were given indicators and progress in meeting these aims was tracked throughout the year for improvement.	Health committee representatives (community members) and health facility staff	Health facilities	Not explicitly, but described the seven steps of their QI process in detail	Seven steps of their process: 1. Identified community priorities through community meetings 2. Analysed and translated priorities into objectives 3. Developed and tested indicators for each objective 4. Analysed general objectives and made specific indicators 5. Developed indicator categories 6. Collected data for monitoring 7. Presented data back to community (by the health committee) and to health centre staff	Four categories of priorities with associated indicators were collected: rational prescription, hygiene indicator, and pharmacy management. Six out of seven facilities showed good improvements across indicators. Notably, under hygiene, four of seven health structures showed 100% improvement in their baseline score.
2004–variable (some facilities 2004–2008, some 2004–2009 or later)	South Africa (4)	To recruit all health care facilities a defined area into a network of sites that can work together to provide comprehensive HIV/AIDS care in a specific area.	The Model for Improvement was used by QITs to test innovations around improving care, adapting successful strategies. QITs identified gaps in HAART initiation rates and changes necessary to achieve monthly initiation targets were agreed upon. Potential solutions to overcome barriers are designed and implemented. New areas for improvement were identified and worked on as the project progressed. Successful "high leverage" strategies were packaged and scaled up for use by all facilities newly joining QI collaboratives for accelerated scale up.	Health facility staff	Health facilities	Not explicitly, although did comment on common "high-leverage" strategies that the QITs worked on	See Table 1 in Barker et al	Within nine months, significant increased in child referral were achieved at three hospital-based ARV clinics. A 20-fold increase in CD4 cell count testing (from 20 to 370 per month) in HIV-positive adults was achieved at an adult facility in Johannesburg, although a large increase in referrals was anticipated and may explain this large increase. Some clinics did not see any improvements and resisted the introduction of changes.

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Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2005–2007	Zambia(5)	To monitor and improve upon HIV services provided after task-shifting	Clinical care was evaluated monthly and feedback was given to staff along with training targeted at areas of poor performance. Clinics exchanged best practices to improve quality. Each site was then evaluated quarterly for performance. Top performers were then rewarded with a proportion of funds, which were usually spent on clinic improvement schemes. High-performing clinics were paired with low-performing clinics to support training and share best practices to improve areas of weakness.	Health facility staff	Health facilities	No		From baseline-to-endline, repeat CD4 testing rose from 82% to 95%, baseline alanine aminotransferase rose from 50% to 77%, baseline haemoglobin testing rose from 63% to 81%, prophylaxis for pneumocystis pneumonia rose from 28% to 78%, and patient clinical review within the past three months rose from 28% to 81%, despite an almost four-fold increase in the number of patients on ART
2006–2007	Ethiopia(6)	To improve hospital management indicators	Nation-wide QI program. Primary challenges in these facilities were identified at baseline. Change in 75 management indicators was followed. Facilities were paired with a Yale-Clinton Foundation fellow from the United States and encouraged through QI processes to make improvements in the 75 indicators.	Health facility managers	Health facilities	No		45 of the 75 (60%) key management indicators were found. These reflected improvements in 105 indicators across the 14 hospitals in the intervention, or 7.5 improvements per facility. Among hospital leaders, 90% were 'very satisfied' with their hospital's quality improvement projects and 90% felt excellent or good about the initiative overall and felt it would benefit other facilities.

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2006–2007	Uganda(7)	To reduce maternal and neonatal mortality	The quality improvement approach is called Client-Oriented, Provider-Efficient services (COPE), in which providers identified and prioritised quality of care problems and set solutions to problems. Guides with "trigger questions" were used to help staff identify problems and to set time-bound action plans. Service statistics around performance are also supplied. Action plans are self-assessed with a tool, which can track changes in quality over time. Supportive supervision was also added in some facilities.	Frontline health facility staff (midwives)	Health facility	Yes	Overall, 50% of the midwives in the study area were trained in the use of the QI tool, and 5% of those trained did not use the tool after training. Of those who used the tool, 50% used it quarterly, and the other 50% used it more frequently. The tool was very easy or somewhat easy to use by 68% of the midwives, and 14% found it difficult or very difficult to use. As midwives used the tool more regularly, they reported having more useful meetings with their supervisors, especially around problem-solving for improved service delivery. The relationship between use of the QI tool and midwives' reports of the degree of usefulness (83% of regular user found meetings helpful compared to 54% who were not trained in the tool and not using it).	In the clinics with the intervention, there were a number of scores that were considerably higher in either intervention group (one receiving only training and supportive supervision) than in controls, namely: equipment and supply, physical infrastructure, number of days services were provided, number of available guidelines and job aids; counselling; family planning service delivery; antenatal scores.
2006–2007	South Africa(8)	To improve coverage of PMTCT in South Africa	Facility performance assessments were undertaken and results were assessed for weaknesses. Improvement targets were set and continuous monitoring was undertaken to support changes.	Health facility staff	Health facilities	Not explicitly, but did describe the intervention phases ad phases ad weaknesses teams identified as the focal point of their QI work	See Table 1 in Doherty et al for intervention phases and Table 3 for key weaknesses	All PMTCT output indicators saw improvements. Testing of HIV-positive mothers for CD4 counts increased from 40–97%, provision of maternal nevirapine increased from 57–96%, and provision of infant nevirapine increased from 15–68%. Early infant testing for HIV increased from 24–68%. Improvements will have averted an estimated 580 infant HIV infections per year

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2006–2007	Kenya and Uganda(9)	To improve HIV service delivery in research facilities	QITs were trained. Exit interviews with HIV-positive clients accessing services were analysed to assess gaps. QITs developed quality indicators and set action plans to achieve them. A final round of exit interviews was conducted to measure improvements in service quality. Planning for additional improvements and action plans to achieve these was carried out.	Researchers, health facility staff, and community health workers	Health facilities	No		There were statistically significant reductions in HIV patient wait times to see counsellors and pharmacists. Significantly more patients reported receiving counselling on family planning. Patient satisfaction with services received from counsellors increased from 87–94%. Satisfaction with the services from community outreach actually decreased from 88–74%.
2006–2008	Niger(10)	To improve the quality of care for mothers and newborns	A collaborative QI approach was used based on the Model for Improvement. There was continuous shared learning between facility QITs. These teams analysed their processes of a care from a system-level perspective, changed processes to encourage best practices, and undertook continuous analysis to assess impact on care.	Health facility staff (managers and frontline providers)	Health facilities	No		The active management of the third stage of labour increased from 2% to >90%. Postpartum hemorrhage decreased by 90% from 2.2% of vaginal deliveries to 0.2% of vaginal deliveries. Emergency newborn care provision increased from 16–96%. Adherence to postpartum monitoring standards for early detection of complications increased from 19–86%.

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Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2006–2009	Malawi (11)	To improve reproductive service delivery and related outcomes	Service quality was evaluated externally at baseline and facility QITs identified performance gaps, designed and implemented interventions to address these gaps, and then assess improvements quarterly. Facilities found to reach at least 80% of performance targets against national standards were recognised as a national centre of excellence for reproductive health.	Health facility staff	Health facilities	No		Facilities receiving the intervention were more likely to have infrastructure, equipment, and systems in place than comparisons. Postnatal care and family planning scores were significantly higher in the intervention facilities. Although the number of caesarean sections increased, no other service utilisation increased. In family planning services, the intervention facilities had significantly higher scores in establishing a cordial relationship with the client and identifying her needs (99%) and identifying the need for protection from sexually transmitted infections, including HIV (73%) compared to the comparison group (84% and 26% respectively. In ANC, the intervention facilities had significantly higher scores for triaging clients who need urgent attention (63%), providing cordial reception and treatment (99%), and conducting physical and obstetric exams (89%) than the comparison facilities (23%, 84%, and 73% respectively)

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Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2006–2009	South Africa (12)	To accelerate the coverage of HAART	QITs set individual facility and collective performance targets and analysed the provision of care in real-time. Teams then designed and implemented simple changes to improve HIV testing and HAART initiation. Teams evaluated their work based on performance targets. Three times per year, teams met with regional and district managers to learn QI methods, set collective targets, review progress, and to exchange best practices.	Health facility staff	Health facilities	Not explicitly, but did comment on main areas of focus and strategies implemented. Also mentioned key implementation challenges.	See Table 1 in Webster et al. The main challenges to implementation included: high staff turnover; reliance on externally provided QI resources—which were sometimes intermittently provided; a lack of stipends, which contributed to turnover; and some inconsistencies in monitoring and providing feedback to staff.	HIV testing in clinics with QITs increased from 891/month to 3580/month (302%). Monthly initiation on HAART increased from 179/month to 511/month (186% increase). The met need for HAART increased from 36% to 72%.

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2006–2009	South Africa (13)	To reduce the transmission of HIV from mother-to-child	Teams used QI methods as per the Model for Improvement and the PDSA cycles. As such, they set aims, mapped the care pathway, identified gaps in care and their causes, created improvement ideas and tested these. Teams were part of learning to set common goals and share successful strategies. The most successful strategies generated by teams became part of a "change package" of strategies to be tested and adapted by other facilities as the project spread.	Health facility staff	Health facilities	Not explicitly, but did comment on main areas of focus and strategies implemented. Also commented on some of the facilities using QI, and key contextual changes during the implementation period	See Table 1 in Youngleson et al. Contextual changes included an increase in the number of ANC clinics in the district, introduction of new ARV providers, supplementing existing ARV providers, additional staff added to support activities, national changes to the district PMTCT protocol, in which prophylaxis was then given earlier in pregnancy and HIV testing occurred earlier in the baby's life.	HIV-exposed infants testing positive for HIV decreased from 7.6% to 5%. The provision of antenatal prophylaxis increased from 74% to 86% and the percentage of pregnant clients on HAART at labour increased from 10% to 25%. The proportion of HIV-exposed infants testing positive declined from 7.6% to 5%. Intrapartum HIV prophylaxis increased from 43% to 84%. Postnatal HIV testing increased from 79% to 95%.
2007–2008	Rwanda (14)	To improve basic care processes (monitoring vital signs, giving drugs, and laboratory testing)	Process maps were used to identify problems and PDSA cycles were used to improve system-level processes in a stepwise fashion. Resources were allocated as needed. Staff were educated about QI and routine care practices. Performance data were reported to staff daily, with a goal of 95% or higher for selected indicators.	Health facility staff	Health facility	Not explicitly, although did highlight some important lessons learned	Lessons learned: 1. Using data as a decision-making tool contributed greatly to the initiative's success. 2. Additional resources being provided to throughout the initiative helped to support activities. 3. Local leadership was particularly important. 4. Seeing early improvements was essential for staff motivation and buy-in	Performance in vital signs was 57%, giving drugs was 63% and appropriate laboratory testing and documentation was 46% at baseline. All indicators increased to consistently over 100% once needed equipment and staff were made available. Real-time data was an effective motivator of performance.

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Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2007–2009	Ghana (15)	To reduce maternal and neonatal mortality	Problems were identified by the QIT (Kybele) using process mapping and focus areas for improvement were grouped into bundles. Improvements in these were evaluated through continuous assessment.	Kyebele (an independent organisation)	Health facility (regional hospital)	Not explicitly, although mentioned key aspects of successful implementation	Mentoring activities were especially useful, and emphasised delegation, the QI methods used, how to give feedback and team building. Dialogue around patient safety and taking actions were encouraged. Through their experiences in QI, several midwives were able to receive a promotion and become QI coaches at other institutions	Maternal mortality decreased by 34% (490 per 100 000 live births to 328 per 100 000 live births) despite a 36% increase in admissions. The case fatalities for pre-eclampsia decreased from 3.1% to 1.1% (p=0.05) and for hemorrhage 14/8% to 1.9% (p=0.001). Stillbirths decreased by 36% (p=0.05).

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2008–2010	Malawi(16, 17)	To improve perinatal, newborn, and maternal mortality	The collaborative approach to quality improvement was used in a selection of health facilities. Facility staff were trained in quality improvement and used PDSA cycles to test change ideas aimed at improving care in health facilities. Local leaders of the QITs received specialised training in neonatal resuscitation and the prevention and management of postpartum hemorrhage, sepsis, and eclampsia. Additionally a community mobilisation initiative was carried out alongside the health facility QI intervention.	Health facility staff	Health facilities	No		The neonatal mortality in clusters with only facilities with QITs was 28.3/1000 live births, and with facilities alongside the community mobilisation intervention, 27/1000 live births, compared to a control of 34/1000 live births. Adjusted neonatal mortality rates were 22% lower in the clusters with the facility QITs and community mobilisation than in controls (OR 0.78, 95% CI 0.60–1.01). The perinatal mortality in clusters with only facilities with QITs was 55.1/1000 live births, and with facilities alongside the community mobilisation intervention, 48.4/1000 live births, compared to a control of 56.2/1000 live births. Adjusted perinatal mortality was 16% lower in clusters with the facility QITs and community mobilisation teams (OR 0.84, 95% CI 0.72–0.97).

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2008–2015	Ghana (Project Fives Alive)(18-21)	To improve health outcomes in mothers, infants and children under-five by improving the coverage, quality, reliability and patient centeredness across all public and faith-based facilities in Ghana.	The project used the Model for Improvement and PDSA cycles to identify process failures and established low-cost change ideas. The approach emphasised systems thinking and use of local data, and learning from data at the local level. Collaboratives of health facilities engaged in peer learning were established.	Health facility staff (managers and frontline providers)	Health facility (although some community-level practices targeted)	Not explicitly, but outlined a particular case study of how health promotion as well as direct communication with households to provide community-level outreach. Involvement of community leaders was essential for outreach. Doing community-level outreach provided an opportunity to get input from community members about how to improve health service utilisation. Barriers to community outreach included fuel shortages, lack of vehicles, poor roads, and large migration of people during the famine season. Some challenges faced by the teams generally included longer intervals between learning sessions, staff turnover, and QI data that was sometimes of poor quality.	There was a decrease in neonatal mortality from 2.5/1000 to 0.9/1000, and in infant mortality from 3.5/1000 to 2.3/1000 between the pre-intervention to post-intervention periods. Skilled delivery increased from 55.9% to 64.7%. Initiation of postnatal care within the first 48 hours increased from 15% to 71% and from 0% to 53% for later postnatal care visits on day six or seven. Facility-based neonatal mortality remained unchanged at 5.1 deaths per 1000 deliveries.
2009	South Africa (22)	To improve PMTCT services at facilities in South Africa	A number of QI tools and methods were used, including the Model for Improvement and PDSA cycles, process mapping to understand system weaknesses, and the IHI Framework for Execution	Health facility staff (managers and frontline providers) and NGO staff	Health facilities	Yes, reported experiences with initial (six month) implementation	A total of 161 facilities participated in the intervention. The intervention actually expanded spontaneously to four additional districts due to demand from district managers. In six months, 676 health workers and managers were trained in QI. The work was facilitated by rapid buy-in and strong project leadership. Introduction of this work within PMTCT—which lies in both child health and HIV—required long periods of discussion and negotiation to gain confidence from the Department of Health.	Not indicated

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2009–2011	Niger(23)	To improve human resources management for improved health outcomes	QITs in each facility were mentored by QI experts from USAID's Healthcare Improvement Project and the Ministry of Health. Two QIT types were formed, one of providers and one of managers who supported facility teams by focussing on management-related goals. Both QITs also focussed on human resources management. The Human Resources Performance Cycle was used to identify gaps and help to suggest strategies. Each member of staff developed a job description with his/her supervisor, articulating tasks and determining needs for training and evaluation. QITs monitored and evaluated their success achieving the steps of the Human Resources Performance Cycle. Assigned tasks within job descriptions were then implemented in facilities, tested, monitored, and adjusted as needed. Experiences were exchanged between facilities.	Health facility staff (managers and frontline providers)	Health facilities	Not explicitly, although briefly commented on how QI activities led to improved worker performance	Provider QITs used feedback mechanisms and developed checklists to analyse skill gaps based on redesigned tasks and jobs. Manager QITs improved supervision and developed performance checklists, observed health workers, and reviewed results.	Skilled attendance at birth increased from 27% to 45%, the prevalence of contraceptive use increased from 9.6% to 36%. Post-partum hemorrhage decreased from 2% to 0.06%. Mortality in under-five-year-olds due to severe malaria decreased from 15% to 4%.

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2009–2013	Tanzania(24)	To improve newborn care and newborn resuscitation	The quality improvement process utilised the Standards Based Management and Recognition approach, in which facility-based QITs were brought together to assess quality at their respective facilities against national basic emergency obstetric and newborn care provision standards. Changes to achieve standards were then put into place and facilities were externally assessed each year. Facilities achieving a score of 80% or higher based on these standards then received recognition from the Ministry of Health and Social Welfare.	Health facility staff (managers and frontline providers)	Health facilities	No		The overall index scores for quality of observed essential newborn care increased from 39% to 73% (p <0.0001). There was a significant improvement in health worker knowledge, from 23% to 41% (p <0.0001), although skills in neonatal resuscitation remained low. There was improvement in the availability of essential newborn care items at lower-level facilities.
2009–present	Mali(10)	To improve the quality of care for mothers and newborns	A collaborative QI approach was used based on the Model for Improvement. There was continuous shared learning between facility QITs. These teams analysed their processes of a care from a system-level perspective, changed processes to encourage best practices, and undertook continuous analysis to assess impact on care.	Health facility staff (managers and frontline providers)	Health facilities	No		Use of the active management of third stage of labour increased from 17% to 95–97%. The postpartum hemorrhage rate decreased from 0.9% to 0.3%. The percentage of births receiving emergency newborn care increased from 25% to 99%. Adherence to postpartum monitoring standards and early detection of complications increased from 19% to 89%.

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2010	South Africa(25)	To adapt an audit tool around tuberculosis/ HIV/sexually transmitted infection performance, assess performance, and set targets to support effective service delivery	Participatory QIT's were established to create an audit tool to assess tuberculosis/HIV/sexually transmitted infection services. The tool was then used to conduct a district-wide audit, assess performance, set targets, and develop plans to address problems identified.	Researcher and health facility staff (managers and frontline providers)	Health facilities	No		Gaps in service provision were identified through the audit tool. Most notably, 71% had received no training in tuberculosis diagnosis and management and 46% were visited monthly by a primary health care supervisor. 80% had experienced non-availability of essential drugs and supplies. There was a delay of 47 days between being eligible for ART and actually initiating therapy. 64% of facilities had no stock mechanisms. In 16% of clinics, no staff were trained in tuberculosis management, and in 3/25 facilities, no staff were trained in the management of sexually transmitted infections. Of 54% of transmitted infections, blood tests sent for HIV diagnosis, results were not noted in either the patient's folder or the facility register.

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Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2010–2013	Ethiopia(26)	To improve community maternal and newborn health care and ensure it reached women and newborns, "in time, every time"	Used a collaborative approach and the Model for Improvement to create and test strategies to address barriers around pregnancy identification, antenatal care registration, participation in training for birth preparedness, and sending to health extension workers and attend post-natal care within 48 hours. District-level coaches supported community-level teams.	Community members (health extension workers, community health development agents, TBAs, pregnant women, families, community elders, community representatives of community-based organisations, and local administrators)	Community (community health workers)	Yes (Results from a questionnaire for implementers around: perceptions of district culture and leadership for improvement activities before intervention; perceptions of district culture and leadership for improvement activities after the intervention finished; motivation for participation in improvement work; and self-assessed capacity for improvement work. Followed up with key informant interviews to elaborate on findings)	Respondents reported significant positive changes in many areas of district culture and leadership. Using improvement data for decision-making increased from 2.8–4.4, using local solutions to improve community-based maternal and newborn care increased from 2.5–4.3, a demonstrated commitment to the health of mothers and newborns increased from 2.6–4.2, and the creation of a supportive coaching environment increased from 2.6–4.0. Mean score for capacity was 3.7. From key informant interviews, themes around community empowerment and focussed improvement emerged strongly.	Result from monthly monitoring indicated that improvement capacity was built. The proportion of pregnant women identified by CHWs who attended their first antenatal care visit increased from 38% to 90%.

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2011–2012	Zambia(27)	To improve PMTCT services at a Zambia defence force facility	An assessment of ANC services was carried out and the Standards Based Management and Recognition tool was used to identify strengths and weaknesses in service delivery. Root causes of weaknesses were explored and action plans to address these were created. Providers were then mentored and coached to implement action plans.	National-level administrators and Jhpiego	Health facilities	No		52% of pregnant women came for ANC within the first 20 weeks and 19% waited until the 28th week or later. Providers' PMTCT skill scores increased from 58% to 75% (p=0.03) in intervention sites and stayed at 52% in comparison sites. In intervention sites, family planning counselling increased from 34% to 75% (p=0.026), testing for HIV at return visits increased from 13% to 48% (p=0.034), HIV/AIDS care that did not involve HIV testing increased from 1% to 34% (p=0.004), and provider ANC skill scores increased from 67% to 74% (not significant). Facility readiness increased from 73% to 88%
2011–2012	Kenya(28)	To increase quality and uptake of ANC, health facility delivery, and PMTCT services	QITs met regularly to discuss performance gaps and their causes. Change ideas to address these were then developed and implemented. Data from government registers were used each month to evaluate performance.	Health facility staff	Health facilities	Not explicitly, but did comment on main areas of focus and strategies implemented. Also commented on additional findings through QI work	See Table 1 in Mwaniki et al. Some quality improvement strategies involved increasing community dialogue. Through these exchanges, additional barriers around care-seeking were recognised: these included: poor provider attitudes; lack of privacy; denying social supports like mothers-in-law in the delivery room; lack of water for mothers to clean themselves after delivery; and a lack of a place to eat. Facility staff then responded to these changes.	The percentage of mothers starting ANC within their first trimester increased from 8% to 24% (p=0.002). Those with four ANC check-ups increased from 37% to 64% (p<0.001). Adherence to ANC standards was achieved in 80–100% of check-ups from <40% (p=<0.001). The percentage of women delivering in health facilities increased from 33% to 52% (p=0.012)

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2011–2014	Benin(29)	To improve the performance and retention of CHWs	Four collaboratives of eight QITs were created. These teams, met monthly to assess CHW performance on specific health indicators, and strategies to improve these were created. Quarterly learning sessions with collaboratives were carried out to share village performance and exchange experiences between teams.	Community members (CHWs, the village chief, secretary and treasurer of the village health committee, women, youth, and representatives from ethnic and religious groups)	Community (community health workers)	Not explicitly, although some implementation findings reported	Within the 28-month study period, 75% of QITs held a regular monthly meeting with their CHW. The QIT members supported the work of CHWs in their communities. The importance of community support of CHWs was also highlighted. As such, the QIT collaboratives provided a structured mechanism for community engagement.	Performance scores were higher among CHWs who received financial incentives and engaged with QITs compared to those who only received a financial incentive. Dropout among CHWs in Benin is around 7% and was typically due to a new job.
2011–2013	South Africa(30)	To optimise PMTCT implementation on and to scale up priority actions nationally	A bottleneck analysis of obstacles to care was carried out by district level health teams and established an action framework of key strategies to improve access to and coverage of PMTCT services. These were measured by key indicators and tracked. Every three months, action reports were created based on data from facilities around these indicators and compiled at the district, provincial, and national level.	National-level administrators	Health facilities	Not explicitly, but intervention phases and key bottlenecks and examples of action items reported on	See Table 1 for intervention phases and Table 2 for bottlenecks and corresponding actions in Bhardwaj et al.	The proportion of pregnant HIV-positive women started on ART increased from 62% to 80.3%. Earlier registration for ANC increased from 43% to 54%. Retesting of pregnant women testing HIV-negative in the first HIV test increased from 28% to 47%.

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
2013–ongoing	Zimbabwe(31)	To support CHWs at the community level	MCHIP (the QI implementer) is using its community-based performance and QI approach. Desired performance and performance standards are set and the gap between desired and actual performance is assessed. The causes of the gap are then analysed and addressed through strategies for performance.	NGO (MCHIP) staff	Community (community health workers)	No		Not yet reported
Not indicated	Rwanda(32)	To strengthen supply chain management for CHWs	QITs set performance objectives and use data from the CHWs to identify gaps in using CHW product resupply procedures and root causes of these. PDSA cycles are used by teams to develop solutions to address these problems and causes. QITs meet monthly at health facilities to review available data against performance objectives, plotting and sharing it, and to prepare an action plan for the month. Mentoring of teams is carried out by the Ministry of Health.	Health facility staff and CHWs	Community (community health workers)	Not explicitly, although some description of implementation activities and accompanying CHW insights provided	The learning sessions were seen by CHWs as being very important and one of the most enjoyable parts of the process. 100% of participants indicated that they learned new things at learning sessions. Participants also mentioned the value of peer exchanges during learning sessions. At learning sessions, district or ministry-level people were sometimes in attendance, which was helpful in addressing some higher-level challenges related to stock-outs.	Among CHWs engaging with a QIT, they had 25% more product availability than the comparison group (63% of CHWs had all five products in stock compared to 38% in non-intervention districts), 99% had no problems reporting on resupply, More than 90% of products had available stock cards.

Year(s)	Country	Aim of the quality improvement work	Description of quality improvement activities	Quality improvement carried out by	Level quality improvement activities aim to improve	Process explicitly studied?	Process findings or comments on process	Key outcome findings
Not indicated	Ethiopia(33)	To improve the performance of health extension workers	The Model for Improvement is used to identify problems around antenatal care, HIV testing, postpartum care, and the availability and use of latrines. Strategies are then created to address problems. Data around specific indicators linked to areas of care targeted by QITs are collected every month to track CHW performance.	Members of community groups, local health post managers, CHWs, health centre staff, government development agents, and religious leaders	Community (community health workers)	Not explicitly, although key lessons learned about implementation shared	Community groups could assemble with the aim of identifying and referring target groups for health services. QITs were able to mobilise the follow-up and referral of patients. QITs can use the community health system to mobilise local resources and to strengthen communication between health facilities, CHWs, and community groups.	Not indicated

Abbreviations used: antiretroviral (ARV), community health worker (CHW), highly active antiretroviral therapy (HAART), prevention of mother-to-child transmission (PMTCT), human immunodeficiency virus (HIV), quality improvement (QI), quality improvement team (QIT), traditional birth attendants (TBAs)

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Appendix 2. Implementation Scores for Villages

The weighting of the scores is described in Chapter 4. Briefly, measures were assigned a weight based on their relative importance. Further, some measures are taken together to provide a composite score for specific aspects of each framework component and would each be assigned a slightly lower weight for the score (e.g. village volunteers aware of health facility quality improvement team /2 + referral health facility team aware of community quality improvement teams /2 + positive interaction described between teams /2 all refer to the interaction between health facility and community-level quality improvement teams, which would have an overall score /6, rather than an overall score of 12, which would give this interaction a far greater weight than the understanding and application of PDSA cycles, for example, which would not be a fair reflection of the importance of these particular intervention aspects).

Table 1. Implementation scores for Village A

Framework Component	Measure	Score
Fidelity	Village volunteers self-identify new knowledge or skills in quality improvement they have acquired	4/4
	Village volunteers understand and can apply PDSA cycles	4/4
	Change ideas generated by village volunteers	3/4
	Change ideas implemented by volunteers	4/4
	Local resources are mobilised in order to implement change ideas	2/2
	Data for each change idea is collected consistently and correctly	4/4
	Real-time data is used by volunteers to influence change ideas	4/4
	Village volunteers feel enabled by EQUIP	4/4
	Extension worker feels a sense of ownership of the intervention	1/1
	Village volunteers feel a sense of ownership of the intervention	4/4
	Village volunteers aware of health facility quality improvement teams' activities	1/2
	Referral health facility quality improvement teams aware of community quality improvement teams' activities	1/2
	Community- and health facility quality management team members describe a positive interaction between them	1/2
TOTAL		**37/41**
Completeness	100% of learning sessions attended by at least one village volunteer	4/4
	At least one village volunteer has attended 100% of monthly meetings	2/2
	Village volunteers regularly submit reports (at least once/month) and engage with their extension worker	2/2
	Change ideas implemented consistently	4/4
TOTAL		**12/12**
Exposure	Village volunteers are receptive to the EQUIP intervention	2/2
	Community members (leaders and pregnant women and their husbands) are receptive to village volunteers	2/2
	Village volunteers have made contact with their broader community (E.g. Invited to speak at community meetings)	2/2
TOTAL		**6/6**
Reach	Percentage of women delivering in a health facility since intervention start (1=1%–60%, 2=61%-75%, 3=76%-90%, 4=91%+)	4/4
	Percentage of women preparing all delivery items since intervention start (1=1%–60%, 2=61%-75%, 3=76%-90%, 4=91%+)	4/4
	A selection of recently delivered women can identify both village volunteers in their community (1=0–25%, 2=26–50%, 3=51–75%, 4=76–100%)	2/2
	A selection of recently delivered women are aware of	2/2

	EQUIP activities (can name at least 1) in their village (1=0–25%, 2=26–50%, 3=51–75%, 4=76–100%)	
TOTAL		**12/12**
Satisfaction	Both village volunteers express a high level of satisfaction in their role	2/2
	Both village volunteers perceive their role to be valuable	2/2
	Village volunteers identify benefits of the intervention (either no harms mentioned, or benefits must outweigh or outnumber harms)	2/2
	Extension worker indicates a high level of satisfaction in his/her role	1/1
	Extension worker perceives his/her role to be valuable	2/2
	Extension worker can identify benefits of the intervention (either no harms mentioned, or benefits must outweigh or outnumber harms)	1/1
	The selection of recently delivered women indicate a high level of satisfaction with the intervention in their village	2/2
	The selection of recently delivered women can identify at least one positive change in their village	2/2
	The selection of recently delivered women can identify benefits of the intervention	2/2
TOTAL		**16/16**
Recruitment	Both village volunteers are from the village they are active in	2/2
	Village volunteers are satisfied with the selection process	2/2
	Extension worker is from a community that he/she supervises	1/1
	Extension worker is satisfied with his/her selection process	1/1
	Village volunteers have previous community involvement	2/2
	Extension worker has had previous community involvement	1/1
	Village volunteers can identify at least two incentives to sustain their involvement	2/2
	Extension worker can identify at least two incentives to sustain his or her involvement	2/2
TOTAL		**13/13**
OVERALL TOTAL		**96/100**

Table 2. Implementation scores for Village B

Framework Component	Measure	Score
Fidelity	Village volunteers self-identify new knowledge or skills in quality improvement they have acquired	3/4
	Village volunteers understand and can apply PDSA cycles	3/4
	Change ideas generated by village volunteers	3/4
	Change ideas implemented by volunteers	4/4
	Local resources are mobilised in order to implement change ideas	2/2
	Data for each change idea is collected consistently and correctly	3/4
	Real-time data is used by volunteers to influence change ideas	3/4
	Village volunteers feel enabled by EQUIP	4/4
	Extension worker feels a sense of ownership of the intervention	1/1
	Village volunteers feel a sense of ownership of the intervention	4/4
	Village volunteers aware of health facility quality improvement teams' activities	1/2
	Referral health facility quality improvement teams aware of community quality improvement teams' activities	1/2
	Community- and health facility quality management team members describe a positive interaction between them	1/2
TOTAL		**33/41**
Completeness	100% of learning sessions attended by at least one village volunteer	4/4
	At least one village volunteer has attended 100% of monthly meetings	2/2
	Village volunteers regularly submit reports (at least once/month) and engage with their extension worker	2/2
	Change ideas implemented consistently	4/4
TOTAL		**12/12**
Exposure	Village volunteers are receptive to the EQUIP intervention	2/2
	Community members (leaders and pregnant women and their husbands) are receptive to village volunteers	2/2
	Village volunteers have made contact with their broader community (E.g. Invited to speak at community meetings)	2/2
TOTAL		**6/6**
Reach	Percentage of women delivering in a health facility since intervention start (1=1%–60%, 2=61%-75%, 3=76%-90%, 4=91%+)	3/4
	Percentage of women preparing all delivery items since intervention start (1=1%–60%, 2=61%-75%, 3=76%-90%, 4=91%+)	4/4
	A selection of recently delivered women can identify both village volunteers in their community (1=0–25%, 2=26–50%, 3=51–75%, 4=76–100%)	1/2
	A selection of recently delivered women are aware of EQUIP activities (can name at least 1) in their village	1/2

	(1=0–25%, 2=26–50%, 3=51–75%, 4=76–100%)	
TOTAL		**9/12**
Satisfaction	Both village volunteers express a high level of satisfaction in their role	2/2
	Both village volunteers perceive their role to be valuable	2/2
	Village volunteers identify benefits of the intervention (either no harms mentioned, or benefits must outweigh or outnumber harms)	2/2
	Extension worker indicates a high level of satisfaction in his/her role	1/1
	Extension worker perceives his/her role to be valuable	2/2
	Extension worker can identify benefits of the intervention (either no harms mentioned, or benefits must outweigh or outnumber harms)	1/1
	The selection of recently delivered women indicate a high level of satisfaction with the intervention in their village	2/2
	The selection of recently delivered women can identify at least one positive change in their village	2/2
	The selection of recently delivered women can identify benefits of the intervention	2/2
TOTAL		**16/16**
Recruitment	Both village volunteers are from the village they are active in	2/2
	Village volunteers are satisfied with the selection process	2/2
	Extension worker is from a community that he/she supervises	1/1
	Extension worker is satisfied with his/her selection process	1/1
	Village volunteers have previous community involvement	1/2
	Extension worker has had previous community involvement	1/1
	Village volunteers can identify at least two incentives to sustain their involvement	2/2
	Extension worker can identify at least two incentives to sustain his or her involvement	2/2
TOTAL		**12/13**
OVERALL TOTAL		**88/100**

Table 3. Implementation scores for Village C

Framework Component	Measure	Score
Fidelity	Village volunteers self-identify new knowledge or skills in quality improvement they have acquired	3/4
	Village volunteers understand and can apply PDSA cycles	2/4
	Change ideas generated by village volunteers	3/4
	Change ideas implemented by volunteers	4/4
	Local resources are mobilised in order to implement change ideas	1/2
	Data for each change idea is collected consistently and correctly	3/4
	Real-time data is used by volunteers to influence change ideas	2/4
	Village volunteers feel enabled by EQUIP	3/4
	Extension worker feels a sense of ownership of the intervention	1/1
	Village volunteers feel a sense of ownership of the intervention	3/4
	Village volunteers aware of health facility quality improvement teams' activities	1/2
	Referral health facility quality improvement teams aware of community quality improvement teams' activities	2/2
	Community- and health facility quality management team members describe a positive interaction between them	1/2
TOTAL		**29/41**
Completeness	100% of learning sessions attended by at least one village volunteer	3/4
	At least one village volunteer has attended 100% of monthly meetings	1/2
	Village volunteers regularly submit reports (at least once/month) and engage with their extension worker	2/2
	Change ideas implemented consistently	4/4
TOTAL		**10/12**
Exposure	Village volunteers are receptive to the EQUIP intervention	2/2
	Community members (leaders and pregnant women and their husbands) are receptive to village volunteers	2/2
	Village volunteers have made contact with their broader community (E.g. Invited to speak at community meetings)	2/2
TOTAL		**6/6**
Reach	Percentage of women delivering in a health facility since intervention start (1=1%–60%, 2=61%-75%, 3=76%-90%, 4=91%+)	3/4
	Percentage of women preparing all delivery items since intervention start (1=1%–60%, 2=61%-75%, 3=76%-90%, 4=91%+)	3/4
	A selection of recently delivered women can identify both village volunteers in their community (1=0–25%, 2=26–50%, 3=51–75%, 4=76–100%)	1/2
	A selection of recently delivered women are aware of EQUIP activities (can name at least 1) in their village	1/2

	(1=0–25%, 2=26–50%, 3=51–75%, 4=76–100%)	
TOTAL		**8/12**
Satisfaction	Both village volunteers express a high level of satisfaction in their role	2/2
	Both village volunteers perceive their role to be valuable	2/2
	Village volunteers identify benefits of the intervention (either no harms mentioned, or benefits must outweigh or outnumber harms)	2/2
	Extension worker indicates a high level of satisfaction in his/her role	1/1
	Extension worker perceives his/her role to be valuable	2/2
	Extension worker can identify benefits of the intervention (either no harms mentioned, or benefits must outweigh or outnumber harms)	1/1
	The selection of recently delivered women indicate a high level of satisfaction with the intervention in their village	2/2
	The selection of recently delivered women can identify at least one positive change in their village	2/2
	The selection of recently delivered women can identify benefits of the intervention	2/2
TOTAL		**16/16**
Recruitment	Both village volunteers are from the village they are active in	1/2
	Village volunteers are satisfied with the selection process	2/2
	Extension worker is from a community that he/she supervises	0/1
	Extension worker is satisfied with his/her selection process	1/1
	Village volunteers have previous community involvement	1/2
	Extension worker has had previous community involvement	1/1
	Village volunteers can identify at least two incentives to sustain their involvement	2/2
	Extension worker can identify at least two incentives to sustain his or her involvement	2/2
TOTAL		**10/13**
OVERALL TOTAL		**80/100**

Table 4. Implementation scores for Village D

Framework Component	Measure	Score
Fidelity	Village volunteers self-identify new knowledge or skills in quality improvement they have acquired	3/4
	Village volunteers understand and can apply PDSA cycles	2/4
	Change ideas generated by village volunteers	2/4
	Change ideas implemented by volunteers	4/4
	Local resources are mobilised in order to implement change ideas	0/2
	Data for each change idea is collected consistently and correctly	2/4
	Real-time data is used by volunteers to influence change ideas	2/4
	Village volunteers feel enabled by EQUIP	2/4
	Extension worker feels a sense of ownership of the intervention	1/1
	Village volunteers feel a sense of ownership of the intervention	2/4
	Village volunteers aware of health facility quality improvement teams' activities	0/2
	Referral health facility quality improvement teams aware of community quality improvement teams' activities	1/2
	Community- and health facility quality management team members describe a positive interaction between them	0/2
TOTAL		**21/41**
Completeness	100% of learning sessions attended by at least one village volunteer	4/4
	At least one village volunteer has attended 100% of monthly meetings	2/2
	Village volunteers regularly submit reports (at least once/month) and engage with their extension worker	1/2
	Change ideas implemented consistently	2/4
TOTAL		**9/12**
Exposure	Village volunteers are receptive to the EQUIP intervention	2/2
	Community members (leaders and pregnant women and their husbands) are receptive to village volunteers	2/2
	Village volunteers have made contact with their broader community (E.g. Invited to speak at community meetings)	2/2
TOTAL		**6/6**
Reach	Percentage of women delivering in a health facility since intervention start (1=1%–60%, 2=61%-75%, 3=76%-90%, 4=91%+)	2/4
	Percentage of women preparing all delivery items since intervention start (1=1%–60%, 2=61%-75%, 3=76%-90%, 4=91%+)	2/4
	A selection of recently delivered women can identify both village volunteers in their community (1=0–25%, 2=26–50%, 3=51–75%, 4=76–100%)	2/2
	A selection of recently delivered women are aware of EQUIP activities (can name at least 1) in their village	1/2

	(1=0–25%, 2=26–50%, 3=51–75%, 4=76–100%)	
TOTAL		**7/12**
Satisfaction	Both village volunteers express a high level of satisfaction in their role	2/2
	Both village volunteers perceive their role to be valuable	2/2
	Village volunteers identify benefits of the intervention (either no harms mentioned, or benefits must outweigh or outnumber harms)	2/2
	Extension worker indicates a high level of satisfaction in his/her role	1/1
	Extension worker perceives his/her role to be valuable	2/2
	Extension worker can identify benefits of the intervention (either no harms mentioned, or benefits must outweigh or outnumber harms)	1/1
	The selection of recently delivered women indicate a high level of satisfaction with the intervention in their village	1/2
	The selection of recently delivered women can identify at least one positive change in their village	1/2
	The selection of recently delivered women can identify benefits of the intervention	1/2
TOTAL		**13/16**
Recruitment	Both village volunteers are from the village they are active in	2/2
	Village volunteers are satisfied with the selection process	2/2
	Extension worker is from a community that he/she supervises	0/1
	Extension worker is satisfied with his/her selection process	1/1
	Village volunteers have previous community involvement	2/2
	Extension worker has had previous community involvement	1/1
	Village volunteers can identify at least two incentives to sustain their involvement	2/2
	Extension worker can identify at least two incentives to sustain his or her involvement	2/2
TOTAL		**12/13**
OVERALL TOTAL		**68/100**

Appendix 3. Process Evaluation Framework

Table 1. Process evaluation framework highlighting questions asked for each evaluation component and methodologies used to collect data

Evaluation Component	Question	Data Collection Methods	Sources
FIDELITY			
1. Determine if skills and knowledge to enable community members to do quality improvement developed	1.1 Do volunteers and extension workers report gaining any knowledge and skills from their participation in EQUIP? 1.2 Do volunteers and extension workers feel enabled to do quality improvement?	1.1 In-depth interviews, focus group discussions, observation 1.2 In-depth interviews, focus group discussions, observation	1.1 Volunteers, extension workers 1.2 Volunteers, extension workers
2. Verify the extent to which needs assessment, change idea creation, change idea testing, and change idea monitoring are actually done and if they are led by	2.1 To what extent is needs assessment (problem identification and prioritization) carried out by volunteers? 2.2 Do volunteers understand the components of the PDSA cycle and how it can guide their work?	2.1 In-depth interviews, focus group discussions, observation 2.2 In-depth interviews, focus group discussions, observation	2.1 Volunteers, extension workers, District Mentor; observation of learning sessions and monthly meetings 2.2 Volunteers, extension workers, District Mentor; observation of learning sessions and monthly meetings

volunteers		
3. Explore volunteer perceptions around if this intervention is community-led		
2.3 Can volunteers understand objectives and how progress towards these can be measured?	2.3 In-depth interviews, focus group discussions	2.3 Volunteers, extension workers, District Mentor;
2.4 How are change ideas generated?	2.4 In-depth interviews, focus group discussions, observation	2.4 Volunteers, extension workers, District Mentor; observation of learning sessions and monthly meetings
2.5 Do volunteers understand the importance of testing change ideas?	2.5 In-depth interviews, focus group discussions	2.5 Volunteers
2.6 What change ideas are created and how are they implemented?	2.6 In-depth interviews, focus group discussions	2.6 Volunteers
2.7 How are locally-available resources mobilized to facilitate the implementation of change ideas?	2.7 In-depth interviews, focus group discussions	2.7 Volunteers, extension workers, village executive officers
2.8 Are change ideas consistently monitored by volunteers? Is local data used by volunteers to facilitate their work?	2.8 In-depth interviews, focus group discussions, observation	2.8 Volunteers, extension workers, District Mentor
3.1 Do volunteers perceive	3.1 In-depth interviews, focus	3.1 Volunteers

themselves as being in a position of leadership within EQUIP?		group discussions	
	3.2 Do volunteers feel ownership of the intervention?	3.2 In-depth interviews, focus group discussions	3.2 Volunteers
	4.1 Do volunteers and health facility quality improvement teams interact? How?	4.1 In-depth interviews, focus group discussions, observation	4.1 Volunteers, extension workers, District Mentor, health facility staff; observation of monthly meetings
COMPLETENESS 1. Determine the number and type of quality improvement activities being carried out at the community-level 2. Determine the	1.1 How many learning sessions were held?	1.1 Program record review	1.1 Learning session minutes
	1.2 What was the content of learning sessions?	1.2 Program record review	1.2 Learning session minutes
	1.3 How many monthly meetings were held in Mahuta and Nanhyanga clusters?	1.3 Program record review	1.3 Monthly meeting minutes
	1.4 What was the content of	1.4 Program record review	1.4 Monthly meeting minutes

number of functioning volunteers	monthly meetings?		
	1.5 How many change ideas were attempted in each village?	1.5 In-depth interviews	1.5 Volunteers, extension workers
	1.6 How many change ideas were successfully tested and scaled up if successful in each village?	1.6 In-depth interviews	1.6 Volunteers, extension workers
	1.7 Were any additional activities undertaken in each village (e.g. sensitization activities, like speaking at village meetings)?	1.7 Program record review, in-depth interviews	1.7 Mentoring and coaching session notes; volunteers and village executive officers
	2.1 What was the volunteer turnover in each village?	2.1 Program record review, in-depth interviews	2.1 Mentoring and coaching session notes; village executive officers
	2.2 What was volunteer attendance at learning sessions and meetings?	2.2 Program record review	2.2 Learning session minutes
EXPOSURE 1. Describe the level of activity of volunteers	1.1 To what extent was each volunteer actively participating in EQUIP in each village?	1.1 Program record review, in-depth interviews	1.1 Mentoring and coaching session notes; village executive officers, volunteers, and

Objective	Sub-question	Data source	Respondents
			extension workers
2. Explore volunteers' receptiveness to the intervention	2.1 How receptive are volunteers to the quality improvement intervention?	2.1 In-depth interviews, focus group discussions	2.1 Volunteers
3. Explore extension workers' receptiveness to the intervention	3.1 How receptive are extension workers to the quality improvement intervention?	3.1 In-depth interviews	3.1 Extension workers
4. Explore intervention targets' receptiveness to the intervention	4.1 Are recently delivered mothers—or other targets—aware of the quality improvement intervention?	4.1 In-depth interviews, birth narratives	4.1 Mothers and fathers
	4.2 Can recently delivered mothers—or other targets—identify EQUIP volunteers?	4.2 In-depth interviews, birth narratives	4.2 Mothers and fathers
	4.3 Are recently delivered mothers—or other targets—receptive to the quality improvement intervention?	4.3 In-depth interviews, birth narratives	4.3 Mothers and fathers
5. Determine if any changes in health-seeking or household-level maternal or newborn care practices have resulted because of the intervention	5.1 Among recently delivered mothers—or other targets—engaging with the volunteers, which messages did they	5.1 In-depth interviews, birth narratives	5.1 Mothers and fathers
		5.2 In-depth interviews, birth	5.2 Mothers and fathers

		narratives	
receive?	5.2 What behaviours prompted by volunteers do recently delivered mothers—or other targets—demonstrate (e.g. did they make birth preparations? Where did they give birth? Are they aware of neonatal and maternal danger signs?)?		
SATISFACTION			
1. Explore volunteers' level of satisfaction with their role	1.1 How satisfied are volunteers with their role?	1.1 In-depth interviews, focus group discussions	1.1 Volunteers
	1.2 Do volunteers perceive their role to be valuable?	1.2 In-depth interviews, focus group discussions	1.2 Volunteers
2. Explore extension workers' level of satisfaction with their role	1.3 What benefits or harms do volunteers associate with their involvement in EQUIP?	1.3 In-depth interviews, focus group discussions	1.3 Volunteers
	2.1 How satisfied are extension workers with their role?	2.1 In-depth interviews	2.1 Extension workers
3. Explore intervention targets' level of satisfaction with the intervention	2.2 Do extension workers perceive their role to be valuable?	2.2 In-depth interviews	2.2 Extension workers
	2.3 What benefits or harms do	2.3 In-depth interviews	2.3 Extension workers

Objective	Question	Method	Respondent
extension workers associate with their involvement in EQUIP?	3.1 How satisfied are recently delivered women with EQUIP?	3.1 In-depth interviews, birth narratives	3.1 Mothers and fathers
	3.2 Can recently delivered women identify changes in their village due to EQUIP?	3.2 In-depth interviews, birth narratives	3.2 Mothers and fathers
	3.3 What benefits or harms do recently delivered women associate with EQUIP?	3.3 In-depth interviews, birth narratives	3.3 Mothers and fathers
REACH 1. Determine the number of intervention targets whom volunteers have been in contact with 2. Determine if	1.1 How many women in each village had contact with volunteers?	1.1 Program record review	1.1 Volunteer counterbooks, health facility birth registers
	2.1 Did recently delivered women reached by the intervention have at least two visits from volunteers?	2.1 In-depth interviews, birth narratives	2.1 Mothers and fathers
	2.2 What messages did recently	2.2 In-depth interviews, birth	2.2 Mothers and fathers

intervention targets are receiving the intervention *correctly*	delivered women receive from volunteers?	narratives	
RECRUITMENT			
1. Describe how the District Mentor, volunteers, and extension workers were selected.	1.1 How was the District Mentor selected? 1.2 How were volunteers selected? 1.3 How were extension workers selected?	1.1 Key informant interviews 1.2 Key informant interview, in-depth interviews, focus group discussions 1.3 Key informant interview, in-depth interviews	1.1 District Mentor and EQUIP staff 1.2 EQUIP staff; volunteers 1.3 EQUIP staff; extension workers
2. Determine whether the District Mentor, volunteers, and extension workers are satisfied with the recruitment process	2.1 Is the District Mentor satisfied with the selection process? 2.2 Are volunteers satisfied with the recruitment process? 2.3 Are extension workers satisfied with the recruitment process?	2.1 Key informant interview 2.2 In-depth interviews, focus group discussions 2.3 In-depth interviews	2.1 District Mentor 2.2 Volunteers 2.3 Extension workers
3. Describe how incentives are used to sustain participation by the District Mentor, volunteers, and extension	3.1 What incentives are identified by the District Mentor identify to sustain his development in EQUIP? 3.2 What incentives are identified by volunteers to sustain their	3.1 Key informant interview 3.2 In-depth interviews, focus group discussions	3.1 District Mentor 3.2 Volunteers

workers	involvement in EQUIP? 3.3 What incentives are identified by extension workers to sustain their involvement in EQUIP?	3.3 In-depth interviews	3.3 Extension workers
CONTEXT 1. Describe the contextual features that may facilitate or inhibit the intervention's implementation	1.1 What is the socioeconomic context of the village?	1.1 EQUIP continuous household survey, social and resource mapping	1.1 Households in Mahuta division, mapping with village executive officers
	1.2 What are the environmental characteristics of the village?	1.2 Social and resource mapping	1.2 Village executive officers
	1.3 What are the village's health service characteristics?	1.3 In-depth interviews	1.3 Village executive officers, health facility staff
	1.4 What is the local governance structure of the village?	1.4 In-depth interviews	1.4 Village executive officers
	1.5 What sorts of maternal and neonatal health or community development activities may be implemented in the community by governmental or non-governmental agencies external to EQUIP?	1.5 In-depth and key informant interviews	1.5 Village executive officers, representatives from NGOs, government officials
	1.6 Where do women receive maternal and neonatal health	1.6 In-depth interviews and birth narratives	1.6 Mothers and fathers

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information outside of the EQUIP intervention?		
1.7 What drives healthcare-seeking and maternal and neonatal care practices outside of the EQUIP intervention?	1.7 In-depth interviews and birth narratives	1.7 Mothers and fathers