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Reflections on the dynamics of the coexistence of multiple knowledge cultures in a community-based maternal health project in Tanzania

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Maternal mortality is a persistent problem worldwide and has received increased international attention as a result of the Millennium Development Goals (MDGs). In Tanzania, and sub-Saharan Africa as a whole, maternal mortality remains high. In Magu District, Tanzania, only 47% of births are attended by a skilled birth attendant, compared to the target of 90% in the MDGs. This study investigates the low uptake of maternal health services in Magu District against the background of different knowledge cultures, arguing that the gulf between local knowledge, biomedical knowledge and organizational knowledge has resulted in a mismatch between demands and needs of women and the supply of services. Stakeholder analysis was undertaken and the needs and experiences of two key stakeholder groups were undertaken: women of reproductive age and healthcare providers. Data collection by interviews, participant observation and focus group discussions took place during May-December 2012. Healthcare providers and women were found to have markedly different perspectives on causes of delay to reaching appropriate care, based on their different knowledge cultures. Healthcare workers cited socio-cultural motivations as main reasons: women's lack of knowledge on the importance of antenatal care or lack of decision-making power in the household. However, most women seemed to base their decision on the perceived accessibility and quality of care. For women, financial risks outweighed the risks of pregnancy. This case demonstrates that improvements in healthcare cannot be reached by simple technical interventions and policies. Instead, partnerships are needed between different stakeholders from different knowledge cultures based on mutual respect and recognition of the value of each other's knowledge.

Keywords: maternal health; knowledge cultures; women; health professionals; multiple knowledges; Tanzania

Introduction

Over the past decade the Millennium Development Goals (MDGs) have been successful in mobilizing public opinion, political leaders and international development agencies in the pursuit of human development and poverty alleviation (Canfin 2013; Friedman 2012; Nayyar 2012; Vandemoortele 2010). As a response to the MDGs, aid flows increasingly recognise the central position of health with attention for decreasing maternal and child mortality as well as a number of communicable diseases (Canfin 2013). Maternal health remains a considerable area of concern (MDG 5). Worldwide, the annual rate of decline from 1990 to 2011 was 1.9% but often lower in sub-Saharan Africa (Lozano 2011) and most African countries have not made sufficient progress in improving maternal health

Causes for maternal death such as obstructed labour, obstetric haemorrhage, obstetric sepsis, hypertensive disorders of pregnancy and abortion are well known and have not changed much in decades (Khan 2006; Nyamtema 2011; Souza 2013). There is, however, no 'magic bullet' to prevent these deaths as they not only result from poor and inaccessible medical care but indicate a long chain of issues ranging from poor nutritional status, lack of education and low socio-economic status making it a complex and persistent problem (Filippi 2006; Nyamtema 2011; Starrs 2006). Improving maternal health demands implementation of a range of strategies such as access to family planning, antenatal care, essential maternity care and emergency obstetric care (Maine 1999). However, the effect of these strategies has been limited due to lack of linkages between interventions in health facilities and the communities they serve (Gil-gonzález 2006; Say 2007).

Participation of communities is used as a strategy to understand local realities, especially in the field of health promotion, and to include local knowledge in planning and implementation of health programmes (Bhutta 2012; Campbell 2000; Darmstadt 2010; Manandhar 2004; Rosato 2008). Including local knowledge requires partnerships between stakeholders inclusive of the community, community decision makers, medical professionals, donor agencies, policy makers and research groups (Levine 1994; Preston 2010). Partnerships are difficult as perceptions of health are based on diverse 'knowledge cultures' formed by different experiences, forms of inquiry and to some extent even languages (Brown 2010a; Rifkin 1990).These 'knowledge cultures' can be seen as the principles, activities and social processes that serve different knowledges and define how this knowledge is expressed (Cetina 2007). Additionally, stakeholders are influenced by institutional contexts, with varied historical and socio-political structures, each with their own interests (Israel 1998; Powell 2010). Institutional demands and priorities of both communities ('bottom up') and organizational institutions ('top down'), might compete in programme focus, time and resources available. For example, policy makers and research groups might need to limit community involvement to meet demands of funding agencies (Israel, Schulz, Parker, & Becker, 1998). Working together in decision making around health related issues therefore requires collective learning and understanding of these diverse knowledge cultures. However, a major impediment to collective learning is the power hierarchy among the contributing interests (Brown 2010b).

In this paper, we reflect on the dynamics between and within different knowledge cultures and how they act as barriers to the use of maternal health services in rural Magu district, Tanzania. Knowledge is derived from the interaction between multiple stakeholders in a variety of contexts while knowledge cultures are heterogeneous and flexible rather than static entities. The study on which this paper is based was undertaken as part of a broader maternal health research project aiming to include the community in the development, planning and implementation of an antenatal care programme.

First, we introduce the context of Magu District and describe how the current study was performed in order to prepare for implementation of an antenatal care programme. This is followed by an account of the knowledge cultures as they emerge and coexist within the field of maternal health. We subsequently elaborate on our methodological approach used in the project and how data for this paper was gathered. Results are presented first as the 'bottom up' perspectives of women and healthcare providers, followed by perspectives of all stakeholders on roles and responsibilities when addressing proposed solutions. We conclude with a reflection on the expression of knowledge by the main stakeholder groups, how they interact and change based on the social context and structure and what facilitated this process. Finally, we will take these reflections into account in the following phases of the project.

Context

Maternal health in Tanzania is typical for many countries in sub-Sahara Africa, having insufficient progress towards achieving MDG 5. Maternal Mortality Ratio (MMR) has remained high over the past 10 years and is currently estimated to be 454 per 100.000 live births. The national average of births attended by skilled health personnel is estimated at 50.5 %, far lower than the target of 90%(Lozano 2011; National Bureau of Statistics (NBS) 2011).

Rural Magu District lies on the shores of Lake Victoria in Northern Tanzania. Currently Magu is divided into 4 divisions, which are divided into 18 wards comprising multiple villages. The estimated population in 2012 was 299,759 (National Bureau of Statistics 2013). The district is mainly inhabited by people who belong to the Sukuma tribe, the largest of Tanzania's more than 120 different ethnic groups. The economy is based on farming and the keeping of livestock. Traditionally, there is a highly structured village organization and each settlement is subdivided into chiefdoms ruled by a chief in collaboration with a group of elders. Dwellings are widely spread and cover a great distance (Wijssen 2002). There are 31 public health facilities in Magu, consisting of one district hospital, four health centres and 26 dispensaries. All health facilities in Magu District provide antenatal-, delivery- and postnatal care. In addition, the district hospital provides comprehensive emergency obstetric care (CEmOC) which includes caesarean sections and blood transfusion services. Hospital data revealed that antenatal care attendance in 2011 was close to

100%. However, few women start antenatal care before the recommended 20 weeks of pregnancy. Despite this high attendance and the overall advice to deliver with a skilled birth attendant, only 47% of births occurred in health facilities.

Coexistence of multiple knowledge cultures in maternal health

Brown (2010) has identified five different knowledge cultures: individual-, community-, specialized-, organizational- and holistic knowledge cultures. All members of a society potentially fulfil all five roles and base their decisions on all five knowledge cultures (Brown 2010a). The importance of adding 'culture' acknowledges that knowledge defined as 'information that is made sense of' only becomes meaningful in context (Powell 2010). Essential knowledge cultures involved within maternal health include local knowledge of women and the communities they live in, the specialist knowledge of healthcare providers such as nurse/midwives and clinicians within the different healthcare institutions and organizational knowledge of governments and local and international non-governmental organizations that are aiming to improve the use of maternal health services by pregnant women.

Individual and community knowledge cultures can be depicted as representing local, traditional or indigenous knowledge, in contrast to specialized and organizational knowledge which is often represented as modern, Western or scientific knowledge (Agrawal 1995; Nygren 1999). This divergence, although not so strict in practice, is due to the predominance of different modes of acquiring this knowledge. Individuals and communities base their knowledge predominantly on practical and personal experiences which are hard to define (tacit knowledge) while specialist and organizational knowledge is dominated by formal and technically expertise (explicit knowledge) (Polanyi 1958).

Women are primary stakeholders in maternal health and including their knowledge in the formation of health programmes seems evident. Women are frequently depicted as poor, vulnerable and as victims of existing social orders, especially in sub-Sahara Africa. Their overall low socio-economic status, lack of education and decision making power, pressure to reproduce, fear of complications and perceived inability to control their own health cannot be denied (Filippi 2006; MacCormack 1992). However, many women demonstrate agency, resilience and strength which are rarely acknowledged in literature. These women have the potential to participate in decision making on health related issues but complex social power relations frequently inhibit this (Rifkin 1990). This is expressed in lack of decision making power in household and community (especially in patriarchal societies) as well as neglect and abuse in health facilities during pregnancy and childbirth (Bowser 2010; d'Oliveira 2002; van Roosmalen 2005). Involving individual knowledge of women in the development of health programmes requires understanding of these power relations as potential barriers for the formation of partnerships (Rifkin 1990).

Within healthcare institutions, nurse/midwives and doctors base their explicit knowledge primarily on their professional training and scientific evidence. They are considered skilled birth attendants as they hold the necessary knowledge and skills to guide women through the process of childbirth and anticipate on potential

complications (WHO 2004). In past decades, pregnancy and childbirth practices, also in Western countries, have become increasingly 'medicalized' and giving birth in medical facilities is encouraged (Davis-Floyd 2001). In Tanzania, the biomedical approach to childbirth has taken over from traditional birthing practices and the scientific knowledge, generally produced in Western countries, is considered universally applicable (Roth Allen 2004). However, healthcare workers' experiential (tacit) knowledge is of significant importance. The complexity of nursing care, particularly in childbirth practices, leads to the apparent use of several heuristic methods (experience-based methods for problem solving, learning, and discovery) in decision making which are not easily defined and understood (Lake 2009)

Organizational knowledge is expressed by governments and non-government organizations. Their internally generated knowledge is based on a combination of specialist knowledge, organizational experiences and agenda setting. Just as specialized knowledge is usually dominant over local knowledge within health institutions, organizational knowledge has held dominance over local realities based on economical and political benefits (Brown 2010a). Donor agendas often decide how health programmes should be executed and which programmes have a priority. This priority is rarely based on local priorities but rather on popular topics and funding opportunities (Pigg 1995).

This gulf between local knowledge, biomedical knowledge and organizational knowledge has resulted in a mismatch between demands and needs of women and the supply of services. Although integration of these different knowledge cultures is necessary for health programmes to succeed, there is no blue-print for establishing the practical execution of this 'fusion' of multiple knowledge cultures within maternal health.

Methodology

Study procedure

The African Woman Alliance (AWA) is an alliance formed out of four interest groups (Box 1) whose mission is to bring down mother and child mortality in sub-Saharan Africa and to protect women's rights. They have developed an innovative concept making use of information and communication technologies (ICTs) which aims to increase the uptake and quality of antenatal care in combination with empowerment of African women. AWA came into contact with Crops Marketing Bureau (CROMABU), a local women's group in Magu and agreed to work together to perform a stakeholder analysis and needs assessment to identify if Magu District would be a potential pilot area for the proposed community-based intervention.

Box 1: the African Woman Alliance (AWA)

Partners in the AWA:

African Woman Foundation (AWF) aims to promote healthcare for women in low income countries through projects that include both medical care and the protection of women's rights. The AWF is a non-profit organization based in Amsterdam, the Netherlands. It is supported and funded by volunteers from the academic world, the government, NGOs and trade & industry. The AWF is a member of the Partnership for Maternal, Newborn & Child Health (PMNCH).

Athena Institute at VU university provides both research and education to address the issues at the interface between science and society. The Athena Institute plays an important role as innovator of transition processes in e.g. Biotechnology, Genomics and Health. The aim of the institution is to develop effective strategies for the management of innovation processes in line with societal priorities. Within the Athena Institute, the project group Women's Health and Women's Rights is involved in the African Woman Alliance.

Bureau Medical Automation (BMA) designs and develops of integral ICT solutions for obstetrics used in Europe. The BMA software solutions – developed in close collaboration with government agencies, hospitals and universities – are designed for fetal monitoring and electronic record-keeping, focusing on the working and decision-making processes at the maternity ward.

Working Party on International Safe Motherhood & Reproductive Rights (ISM&RR) is an academic working group based in the Netherlands whose ambition is to transfer knowledge on reproductive healthcare and to raise awareness on maternal death and child mortality, especially in low income countries.

Source: African Woman Alliance website

Project Team
A local project team was established with one PhD student, two MSc students, the local project coordinator and one research assistant. The local project coordinator is the director of CROMABU who was involved in the planning and execution of the study. The translator was actively involved in formulation of the interview guides and planning for focus group meetings and feedback sessions.

After stakeholder analysis was performed (Box 2) initial needs assessment was conducted to identify problems, ideas, opinions and wishes of two main stakeholders: healthcare providers and women of reproductive age. This took place May-November 2012 and consisted of semi-structured interviews and focus group discussions. After initial analysis, feedback sessions were held with all stakeholders to validate findings and discuss how to proceed. The District Commissioner (DC) and the District Medical

Officer (DMO) were asked for suggestions and support from the start of the study. They suggested the assistance of the District Reproductive and Child Health Officer (DRH) throughout the study.

Box 2: Stakeholder analysis of Magu District

District office
- District Commissioner (DC)
- District Executive Director

District hospital
- District Medical Officer (DMO)
- District Reproductive and Child Health Officer (DRH)
- Medical officers
- Hospital matron
- Nurses and midwives

District health facilities
- Assistant Medical and Clinical officers
- Nurse/midwives
- Nursing assistants

Communities
- Community Councilor (CCA)
- Ward Executive Officer (WEO)
- Village Executive Officer (VEO)
- Village leader or chairman
- Women's and men's representatives
- Traditional birth attendants (TBA)
- Community health workers (CHW)

Needs assessment

Within the healthcare system, numerous stakeholder groups are involved. For the overall project the perspectives of healthcare workers and women of reproductive age were essential to gain an insight into their perceived needs with regards to antenatal care. Interviews were conducted with healthcare providers from the district hospital, health centres and dispensaries and with female community members of reproductive age. Their perspectives will be used to gain insight into the different knowledge cultures that interact within maternal health services. Community councillors and village leaders helped select research participants. Interviews were guided by the main indicators of health system performance: availability, accessibility, acceptability and quality of care. Informal conversations assisted the formulation of context specific questions. An open-ended interview guide was used to assist this process. All interviews were face to face with the help of a translator conversant in Swahili and Sukuma. All information collected through interviews was tape recorded if permission was granted

Validation of findings
After analyzing data from the interviews andfocus group discussions, we returned to Magu to seek feedback from the communities to verify our findings and report to all levels. This allowed us to place the perspectives of women and healthcare workers in a broader context of interacting knowledge cultures. Feedback meetings were held at district, hospital and community level. We returned to four villages, evenly spread in the district, and reported the findings requesting feedback. This was followed by meetings at the hospital and district level.

To encourage attendance, meetings were planned a week ahead and invitation letters were sent to the villages. Key-informants at district level were purposely selected according to their position in policy and decision making in Magu and based on their experience in maternal health. In consultation with the DMO, key-informants were engaged at village level. We returned to the wards or villages where initial interviews were also held.

Data analysis
All information collected through semi-structured interviews and focus group discussions were subject to content analysis making use of pre-defined themes focusing on health system performance indicators. Recorded data was transcribed and translated verbatim. Transcripts were combined with journal notes and pictures taken in the dispensaries and health centres. Quotes in this paper are directly translated quotes from informants.

Data analysis was mainly done by the two MSc students; reflections and interpretation of the data were performed together with the other team members. Feedback meetings ensured respondent validation and collaborative discussion of gained knowledge, increasing its accuracy and validity (Mays 2000). Transcripts of field notes and recordings were analyzed manually. An iterative process of data analysis identified emerging themes which were discussed between fieldworkers and authors and reflected upon during feedback sessions. The inclusion of local knowledge was based on journal notes and numerous reflections and discussion between the authors.

Research approval
Research clearance was provided by the Tanzanian Commission for Science and Technology (COSTECH). Additionally permission was granted by the DC and DMO. Village leaders granted permission to talk to the community members and were willing to assist in the selection process of informants

Results

A total of 28 in-depth interviews, 4 focus group discussions (FGDs) and 6 feedback sessions were held. Participants comprised 88 community members (including male

and female representatives and community leaders), 33 healthcare providers and six representatives from the local authorities. Results are reported on in two sections. First, an overview of maternal health services are presented based on the perspectives of women and healthcare providers and, second, views regarding community responsibility and organizational responsibility.

Determinants of maternal health

To structure our analysis we used the Three Delays model of Thaddeus and Maine (1994) as it provides a chronological perspective from community to facility level on causes for delay in receiving appropriate care. The model identifies three phases of delay: phase 1) delay in deciding to seek care, phase 2) delay in reaching health facilities and phase 3) delay in receiving adequate treatment in health facilities (Thaddeus 1994).

Delay in the decision to seek care

The perceived low risk of pregnancy and childbirth has frequently been reported as a factor for delay (Roggeveen 2013; Thaddeus 1994). Women might not realize the need for early antenatal care or the need for skilled birth attendance because they do not realize the potential benefits of care or the risks associated with delay in reaching this care (Magoma 2010; Myer 2003). Sometimes, however other priorities require them to stay at home. Examples are the need for cultivating the land, going to the market or watching over the other children in the family. Lack of understanding of benefits of care is frequently referred to as 'ignorance' which is also mentioned by the following healthcare worker:

> *Mothers, they are very complicated. A mother can start feeling a lot of pain, and still not inform her husband or anyone else in the family. Only until there is severe labour pain, then they inform them. So, when she needs to come here, some deliver on their way. I believe this is caused by the mother's ignorance.*

Women themselves also referred to those who do not deliver at health care facilities as ignorant because of a lack of knowledge. Sometimes it is not so much the lack of knowledge but the lack of influence in the decision to seek care. Although women rarely mentioned the role of men in care seeking decisions, healthcare workers felt their influence was significant as is expressed by the statement below:

> *Mothers or women, they are not able to decide their selves that 'let me go to the hospital', if she is at home and she starts labour, she will wait until her husband comes, or until her husband gives permission that 'yes you can go.' The decision maker is the husband.'*

Women do, however, also make a deliberate choice to stay away from health care services, weighing benefit of care against costs (Roth Allen 2004; Wijssen 2002). Fear of high transport costs incurred by unexpected frequency of visits and costs for materials and supplies cause women to stay at home. Although health services for pregnant women in Tanzania are officially 'free', this does not always translate into practice, as is evident in the following comment:

> *I didn't pay for the ANC* [antenatal] *services. But I was asked to buy gloves, a basin, a razor and sewing yarn. It costs 7000 Tsh. For the gloves alone it is 2000 Tsh (= 1 euro). I was asked to pay 1000 Tsh for the clinic card and the postnatal card, which I paid. I did not have to pay for the delivery.*

Healthcare workers inform women about birth preparedness during their educational sessions. They inform them to prepare the necessary materials, save some money and plan for transport when labour starts. Reasons for this are frequent lack of supplies, particularly gloves, essential drugs and delivery kits. All women reported that they had to buy different products and materials such as the antenatal care booklet, two pairs of gloves and even kerosene to provide fuel for the clinic. A village leader shared his frustration: 'It is free, but here it is not free, nothing is free'.

Delay reaching health facility

The quality of roads in Magu District varies greatly. Some villages are easily accessible by car; others only had small paths for frequent motorcycles or bikes. Women did not report that distances influenced their ability to go to antenatal care including walking for up to one hour. Difficulties arise when labour starts. Women and healthcare workers addressed the problem of transport and large distances in case of labour, especially during the night. Ambulances would not be able to access some of the villages and, in emergencies, women would first need to be carried to the main road on the back of a bicycle or motorcycle. Difficulties in contacting an ambulance are illustrated by the following statement:

> *If you want the ambulance to come, you have to report first to the doctor and the doctor is going to call an ambulance. You can't call yourself. Where are you going to get the number for an ambulance? You can't, you have to report [to the health facility] first. If there are nurses and doctors available, we can take the pregnant woman to the dispensary and they are going to see if the situation is getting worse. They are the ones who are going to call for Magu Hospital for referral. But there is no way that a resident or citizen can contact the hospital directly for an ambulance.*

The mode of transport determines transport costs. Although women were able to pay the motorcycle trip for antenatal care, the majority considered the costs of emergency transport prohibitive. Furthermore, healthcare workers advised women to bring money to dispensaries in case they would need referral requiring additional transport. Referral to emergency care would involve approximately two hours' drive to Magu Hospital which is too long in cases of foetal distress or severe bleeding.

Delay in receiving appropriate care

Delays in delivery of care after reaching the health facility are symptomatic of the substandard care resulting from staff shortages and lack of essential equipment and supplies. Deficiencies in the quality of care provided at health facilities are frequently mentioned in the literature (Magoma 2011; Pembe 2010; Spangler 2012; Thaddeus

1994). After arriving, most women report to wait for more than one hour before being seen by a healthcare worker.

Women reported considerable differences in the actual care received during antenatal care consultations, consistent with other studies in Tanzania (Magoma 2011; von Both 2006). In Tanzania, antenatal care is provided according to the 'focused antenatal care guidelines' which requires healthcare providers to perform certain tasks and investigations (Von Both 2006). Both women and healthcare providers reported that it is a challenge to perform all tasks due to time constrains, lack of equipment (such as for blood and urine tests) or lack of staff. Some women described being examined from head to toe, receiving investigations for blood pressure, urine and blood, and medications for malaria and anaemia. Others expressed a lack of trust in the quality of the health services received. One woman, a nurse by profession who is currently working in a pharmacy, shared her neighbour's experience:

> *The services in* [the health centre] *are not good because they can't examine you properly. They can listen to the heartbeat of the baby and say it is ok and everything they have written on the card is ok but the same day you can come home and start having a problem. You can find that the baby is dying inside and they have still told you that the heartbeat is normal.*

Others mentioned they were only with the healthcare worker for a short time, feeling unsatisfied with the care received. Poor health education contributed to this dissatisfaction:

> *It takes some months to get education, so it depends if you are available that day. Then you are lucky because* [education] *is not every day at the dispensary. Maybe it is only once per 5 month. I haven't received any advice about things; they just examined me and tested for HIV. I was negative and was only told to prevent myself from getting HIV. But there was no other health education given about other diseases or health issues.*

Other studies have also demonstrated that health education is the component of antenatal care that is least likely to be delivered (Villar 2001; von Both 2006).

The majority of women reported that they have to buy supplies for antenatal care and delivery but that their equipment will not be used if supplies are available at the clinic. However, some women were scolded if they did not bring the necessary equipment:

> *If you fail to buy them, they are very furious, they* [nurses] *will throw bad words and if you don't have, they have there and you have to buy them, you still have to buy them there.*

Shortage of supplies and medicines is a longstanding issue. In the 1990s, Roth Allen observed that health workers were blamed for the shortage of medicines since they, many believed, sold the medicines for some extra money (Roth Allen 2004). One of the women reported a similar suspicion with regards to the equipment being sold by

the nurses. Discrimination in treatment, rude behaviour and tensions between healthcare providers and patients have been mentioned in other studies (Bowser 2010; Fonn 2001; Jewkes 1998; Roth Allen 2004). In this study women also shared that they were lucky to receive good care but that women coming from neighbouring villages were treated badly if they did not have an antenatal card, arrived late in pregnancy for antenatal care or did not have the money to pay for supplies.

Experiences such as these, where women did not receive appropriate antenatal care, also caused women to delay their decision to seek care. This was confirmed by one of the healthcare workers:

> *The mother is feared to deliver here, because they fail to buy gloves. It is expensive when they attend at the local pharmacy one pair of gloves is 2000 Tsh, so they fail to buy it. Even if we have lot of gloves, we receive so many mothers to deliver here. But if there are no gloves, there are no deliveries, because then nothing can be done. We cannot deliver by using our bare hands.*

Although the rude behaviour of nurses was mentioned as a barrier to care, women did express their understanding of it because of the hardship faced by healthcare workers:

> *Sometimes because there are only two nurses, they have too much work and they get a bit frustrated but they are not reacting in a bad way. For example when you arrive late, like at one pm, they [the nurses] are back at their homes but when they come they are not that rude, they are not acting in a rude way. I understand because they have done too much work.*

Health workers themselves are experiencing stress due to hard working conditions, high workload, lack of personnel and being underpaid (Human Rights Watch 2011). Moreover, they have no opportunity to complain about these practices and no official complaint system is in place.

Stakeholders' roles and responsibilities

After reflection and analysis of the needs assessment, feedback meetings were organized for validation of the findings, to build on existing relationships and to observe the impact of our results within and between stakeholder groups. Local authorities were curious about the results of the needs assessment and welcomed the presentation of our findings. There was a high turnout in all four meetings in the communities, on average each meeting was attended by more than 25 people including healthcare workers from the health facilities in those respective communities. Results were presented by a poster presentation to visualize our findings and feedback was requested.

At the community level participants agreed with the findings and felt it was a good representation of the realities that people face in the health facilities and the communities. Health care providers at the district hospital level did not fully agree with our findings. Overall they considered the quality of care provided as good and that all necessary activities during antenatal care are done according to the national

guidelines. They felt that certain research findings were not representative for the situation at the district hospital but only account for the situation in the remote areas of the district. Overall, they expressed the hospital care in a more positive light. As we validated our findings with the communities before meeting at the hospital level we felt that we could convey that our findings reflected the experiences of community members. One reason for the fact that they did not agree with the findings could be that the research mainly took place in the communities and local health facilities there. It is evident that health care workers did not agree that women were requested to pay for supplies and services. They did agree, however, that there is much room for improvement regarding the overall maternal health situation in the district. At local authorities level the DMO confirmed that at some facilities payments are requested which is against local policy. Many questions emerged following presentation of our findings. They were curious to gain a deeper understanding of reasons why women not deliver with a skilled birth attendant.

Table 1: Proposed responsibilities for main stakeholders according to the communities

	Community level	**Health authorities level**	**NGO/AWA**
Community level	Provide fuel for disinfecting equipment in the dispensaries, to improve accommodation for health workers	To motivate each other to provide education according to focused services.	To provide education to the community and the health care providers.
	Provide fuel and allowance for a driver for emergency transport	To take care of the equipment that was given to them.	To bring equipment and supplies to health care providers use.
	To provide volunteers to assist the dispensaries and be trained as community health workers	Village authorities and national government are responsible for sufficient equipment, buildings and health care services	To provide emergency transport, like a car, motorcycle and/or bicycle
	Provide materials and workers to (re)build health facilities		To provide allowances to the health care providers.
Organization	To collaborate with AWA on the project and share responsibility	To do research to recognize the people who are in need of services.	To contribute to project suggested by the community
	Organize education with regards to reproductive health to the community	The national government should bring health care providers who are knowledgeable and professional to serve women.	To follow up the proceeding of the project
	To motivate each other in the community in gain more knowledge and discovering how to solve the problems that are here.	Healthcare workers should provide better services	To give power to the village leaders in supervising the project.
	To implement the plans of all the things that we have discussed in our meetings		To do follow up in collaboration with leaders and community.
	To motivate community and to follow up the implementation and see the progression		

The initial problem framing discussed during the meetings resulted in the quest for possible solutions for the issues identified and appropriate problem solvers in the perspectives of all stakeholders. Solutions proposed were primarily short-term such as: increase of supplies, modes of transport, accommodation for healthcare providers and education sessions in the communities on a wide range of topics. Table 1 provides an overview of responsibilities of different stakeholders regarding proposed solutions as expressed during feedback meetings with the community.

Communities identified AWA as an important stakeholder and felt that some responsibilities were their task as well. Potential solutions provided by the health workers were short term pertaining to availability of equipment and supplies as well as an increase of their salaries. At district authority level, key-informants were highly interested in the results but believed, before they could decide on important solutions, there was a need for further research to increase understanding as to why the majority of the women still deliver at home. Regarding the responsibilities they felt that focus should be at a national level, to ensure improvement in availability of equipment and supplies. At community level they felt responsibility should focus on increasing awareness about the importance of antenatal care attendance and health, family support during pregnancy and family planning. All meetings resulted in the commitment to continue with the project and additional research by MSc students was welcomed.

Discussion

Two key groups are evident in the field of maternal health, namely healthcare providers and women of reproductive age. This research demonstrates that healthcare providers and women have markedly different perspectives on causes of delay to reaching appropriate care, based on their different knowledge cultures. Healthcare workers cited socio-cultural motivations as main reasons: lack of knowledge on the importance of antenatal care or lack of decision-making power in the household. They base this understanding on the evidence that illiteracy, poverty, and the low status of women affect their healthcare seeking behaviour (Filippi 2006). However, most women seemed to base their decision on the perceived accessibility and quality of care. For women, financial risks outweigh the risks of pregnancy.

Health workers' perceptions that women are 'ignorant' illustrates the value health workers give to women's knowledge. However, women also called themselves ignorant, referring to their lack of scientific knowledge about pregnancy and the risks associated with it. Interaction with the health system creates this awareness of lack of knowledge, illustrating that interaction with scientific ways of knowing has an effect on local knowledge. Local knowledge, therefore, cannot be defined as one way of knowing as it changes continuously in interaction with other social actors and knowledge cultures. This contradicts the way specialist and organizational knowledge often devalue local knowledge as being 'non-knowledge'(Agrawal1995; Nygren 1999). Integration of all diverse knowledge cultures and the formation of partnerships

between stakeholders with a different knowledge culture requires mutual respect from different knowledges and recognition of equality, value and importance.

Women base their knowledge on their individual roles as well as their roles as members of a community. Healthcare providers can be seen as specialists but they are also individuals within the same community as the women. Healthcare providers are dominant at the healthcare institutions and women generally trust them for their expertise since they have received training and possess knowledge that women themselves are lacking. This gives healthcare providers a certain form of authority (Bluff 1994; Davis-Floyd 2001). During feedback meetings, it became evident that the position of healthcare providers in a community was similar to that of the women. Although they seemed more valued for their education and specialized knowledge, community structures do not attribute them the high ranks they appear to have in the health facilities. Chiefs and councillors have a naturally higher position. Existent power relations within and between stakeholder groups should not be undermined as they are intimately related to people's lives and economic interests (De Vos 2009). Partnerships and dialogue at an equal level has the potential to destroy these structures of social class that determine their way of life and survival as they in many cases do provide protection and security. Brown (2010) acknowledges the functionality of hierarchal structures and proposes framing of the issues in such a way that partnerships are seen as beneficial and valuable in addressing mutual 'wicked' problems (Brown 2010a).

Stakeholder groups are not homogeneous and the knowledge cultures on which individuals within these groups base their knowledge are not fixed (De Vos 2009). Depending on the position and role that an individual holds in society, decisions and actions are based on a combination of these cultures. The more positions present, the more difficult it becomes to integrate these cultures. Although there may only be five different knowledge cultures such as defined by Brown (2010), there are multiple combinations of these cultures within one individual, defining knowledge and how it is expressed.

Knowledge can be seen as a social construct in which ways of understanding are constructed in interaction with the context in which they develop (Nygren 1999) and as part of a larger knowledge society. As a result, knowledge cultures have real political, economic and social effects which are not neutral with respect to social structures and interests or with respect to economic growth (Cetina 2007). It is important to understand and reflect on the institutions behind these knowledge cultures and how they influence individual behaviour and expression of knowledge (Illich 1975). Healthcare institutions act according to specific agenda's and norms developed by international agencies guided by quantitative targets such as the MDGs leading to the assumption that improvements in health can be reached with simple technical interventions and policies while they actually require complex changes in society (Vandemoortele 2011).

Expecting health workers to work in Western ways with protocols and certain special equipment is contradictory when working conditions are characterized by scarcity of

even the most basic essentials supplies and medicines (Davis-Floyd 2001; Mathole 2005; Roth Allen 2004). As a consequence this disjunction with international protocols and day to day realities prompt healthcare providers, on occasion, to find inappropriate solutions. Neglect of treatment or forcible payments with lack of accountability systems in place are examples of how misuse of authority and power has an impact on the care received by women. The institutional setting in which healthcare providers gain their social status has caused some of them to misuse this position in the healthcare setting. This is called the 'burden of a dual legacy': the bio-medical background causing them to focus more on problems or disease rather than on the individual person; and the abuse of the authority that has been conferred upon them in patient-caregiver relationships (Haddad 1998). Partnerships between these groups are confronted with these power differences and will affect the trust level between these groups.

An atmosphere of openness, trust and respect are essential principles for successful partnerships and inclusion of local knowledge (Abma 2010). Assessing these conditions in the initial phases is difficult and demands the allocation of time to identify existing social relationships and interactions. Trust is essential in the formation of partnerships between healthcare providers and women. In the end 'at the heart of healthcare provision is patient/provider interaction'(Gilson 1994). The low number of women attending to these institutions to deliver might reflect their experiences and their lack of trust in the health system to deliver quality of care, and to treat them with dignity and respect. Interpersonal trust determines the value people attribute to a health system and whether they will return (Gilson 1994). Knowledge integration alone is not sufficient to meet understanding and consensus to move forward. Creation of conducive conditions with trust as its core principle is essential for true partnership.

Development of health programmes should pay attention for local ownership, inclusiveness, alignment, coordination, as well as mutual accountability (Canfin 2013). Nygren (1999) called it 'paying lip service to local knowledge' when this inclusion was mainly meant to achieve success in development programmes. Historically, inclusion of local knowledge has amounted to tokenism benefiting researchers rather than the community of which it is part. Based on these experiences it is not strange that community members are suspicious of researchers' and organizations' intentions and their roles in partnerships. Assumptions such as these are often hidden and might cause mistrust and resistance to participation in projects initiated by external organizations (Campbell 2000; Koné 2000).

Retrospectively, the initial project phase in Magu is not easy to distinguish from other health programme interventions. During feedback meetings, communities identified the research team and AWA as important stakeholders. We had however, never defined our self as a stakeholder but by placing ourselves in this existing society we became part of it. Internal reflection of our own interests and potentially hidden assumptions is therefore equally important as reflecting on existing stakeholder groups. Although considerable data was available to reflect on the participating knowledge cultures in this project, maternal health related issues are confronted with

multiple stakeholder groups and knowledge cultures. Since this analysis was done retrospectively, reflection on all interactions of knowledge cultures was not possible but deserves our attention in the continuation of the project.

Conclusions

The study in Magu District, Tanzania, results in valuable lessons regarding reflections on the dynamics that take place within and between different knowledge cultures. It also shows that knowledge cultures are dynamic and change depending on roles and responsibilities, influenced by the context in which they are recognized, generated and valued. Formation of partnerships between these knowledge cultures within a health programme requires respect for hierarchal positions, acknowledgment of cadres of expertise and building on existing and traditional relations. Building partnerships remains challenging as it requires the formation of trust and true understanding of the different knowledge cultures and how they interact and change.

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References

Abma, T. A. and Broerse, J. E. W. (2010) Patient participation as dialogue: setting research agendas. *Health Expectations* 13(2) 160–173

Agrawal, A. (1995) Dismantling the divide detween indigenous and scientific knowledge. *Development and Change* 26(3) 413–439

Bhutta, Z. A. Cabral, S. Chan, C.W. and Keenan, W. J. (2012) Reducing maternal, newborn, and infant mortality globally: an integrated action agenda. *International Journal of Gynaecology and Obstetrics* 119 Suppl 1, S13–17

Bluff, R. (1994) "They know best ": women's perceptions of midwifery care during labour and childbirth. *Midwifery* 10(3) 157-164

Bowser, D. and Hill, A. (2010) Exploring evidence for disrespect and abuse in facility-based childbirth: report of a landscape analysis. USAID: Washington, DC

Brown, V. A. (2010a) Collective inquiry and its wicked problems. In: Tackling wicked problems: through the transdisciplinary imagination. (edited by V. Brown, J. Harris, and J. Russell) Earthscan: London

Brown, V. A. (2010b) Multiple knowledges, multiple languages: are the limits of my language the limits of my world? *Knowledge Management for Development Journal* 6(2) 120–131

Campbell, C. and Jovchelovitch, S. (2000) Health, Community and Development: Towards a Social Psychology of Participation. *Journal of Community & Applied Social Psychology* 10(4) 255–270

Canfin, P., Eide, E. B., Natalegawa, M., Ndiaye, M., Nkoana-Mashabane, M., Patriota, A., and Towichakchaikul, S. (2013) Our common vision for the positioning and role of health to advance the UN development agenda beyond 2015. *The Lancet* 381(9881) 1885–1886

Cetina, K. K. (2007) Culture in global knowledge societies: knowledge cultures and epistemic cultures, *Interdisciplinary Science Reviews* 32(4) 361–375

Darmstadt, G. L., Choi, Y., Arifeen, S. E., Bari, S., Rahman, S. M., Mannan, I., Seraji, H. R., et al. (2010) Evaluation of a cluster-randomized controlled trial of a package of community-based maternal and newborn interventions in Mirzapur, Bangladesh. *PloS one 5*(3) e9696

Davis-Floyd, R. (2001) The technocratic, humanistic, and holistic paradigms of childbirth. *International Journal of Gynaecology and Obstetrics 75 Suppl 1*, S5–S23

De Vos, P., De Ceukelaire, W., Malaise, G., Pérez, D., Lefèvre, P., and Van der Stuyft, P. (2009) Health through People's Empowerment: A Rights-Based Approach to Participation. *Health and Human Rights* 11(1), 23-35

d'Oliveira, A. F., Diniz, S. G., and Schraiber, L. B. (2002) Violence against women in health-care institutions: an emerging problem. *The Lancet* 359(9318) 1681–1685.

Filippi, V., Ronsmans, C., Campbell, O. M. R., Graham, W. J., Mills, A., Borghi, J., Koblinsky, M., et al. (2006) Maternal health in poor countries: the broader context and a call for action. *The Lancet* 368(9546) 1535–1541

Fonn, S., Mtonga, a S., Nkoloma, H. C., Bantebya Kyomuhendo, G., daSilva, L., Kazilimani, E., Davis, S., et al. (2001) Health providers' opinions on provider-client relations: results of a multi-country study to test Health Workers for Change, *Health Policy and Planning 16 Suppl 1*, 19–23

Friedman, E. A., and Gostin, L. O. (2012) Pillars for progress on the right to health: harnessing the potential of human rights through a Framework Convention on Global Health, *Health and Human Rights* 14(1), E4–19

Gil-gonzález, D., Carrasco-portiño, M., and Teresa, M. (2006) Public Health Reviews Knowledge gaps in scientific literature on maternal mortality: a systematic review. *Bulletin of the World Health Organization* 84(11) 903-909

Gilson, L., Alilio, M., and Heggenhougen, K. (1994) Community satisfaction with primary health care services: an evaluation undertaken in the Morogoro region of Tanzania. *Social Science & Medicine* 39(6) 767–780

Haddad, S., Fournier, P., Machouf, N., and Yatara, F. (1998) What does quality mean to lay people? Community perceptions of primary health care services in Guinea. *Social Science & Medicine* 47(3) 381-394

Human Rights Watch. (2011) "Stop making excuses": Accountability for maternal health care in South Africa. *Human Rights Watch*: United States of America

Illich, I. (1975) Medical nemesis: the expropriation of health. Calder & Boyars: the University of California

Israel, B. A, Schulz, A. J., Parker, E. A, and Becker, A. B. (1998) Review of community-based research: assessing partnership approaches to improve public health. *Annual Review of Public Health* 19 173–202

Jewkes, R., Abrahams, N., and Mvo, Z. (1998) Why do nurses abuse patients? Reflections from South African obstetric services, *Social Science & Medicine* 47(11) 1781–1795

Khan, K. S., Wojdyla, D., Say, L., Gülmezoglu, A. M., and Van Look, P. F. A. (2006) WHO analysis of causes of maternal death: a systematic review. *The Lancet* 367(9516) 1066–1074

Koné, A., Sullivan, M., Senturia, K. D., Chrisman, N. J., Ciske, S. J., and Krieger, J. W. (2000) Improving collaboration between researchers and communities. *Public Health Reports* 115(2-3) 243–248

Lake, S., Moss, C., and Duke, J. (2009) Nursing prioritization of the patient need for care: a tacit knowledge embedded in the clinical decision-making literature. *International Journal of Nursing Practice* 15(5) 376–388

Levine, D., Becker, D., and Bone, L. (1994) Community-academic health center partnerships for underserved minority populations. *Journal of American Medical Association* 272(4) 309–311

Lozano, R., Wang, H., Foreman, K. J., Rajaratnam, J. K., Naghavi, M., Marcus, J. R., Dwyer-Lindgren, L., et al. (2011) Progress towards Millennium Development Goals 4 and 5 on maternal and child mortality: an updated systematic analysis. *The Lancet* 378(9797) 1139–1165

MacCormack, C. (1992) Planning and evaluating women's participation. *Social Science & Medicine* 35(6) 831–837

Magoma, M., Requejo, J., Campbell, O. M. R., Cousens, S., and Filippi, V. (2010) High ANC coverage and low skilled attendance in a rural Tanzanian district: a case for implementing a birth plan intervention. *BMC Pregnancy and Childbirth* 10:13

Maine, D., and Rosenfield, A. (1999) Commentary The Safe Motherhood Initiative : Why Has It Stalled? *American Journal of Public Health* 89(4) 2–4

Manandhar, D. S., Osrin, D., Shrestha, B. P., Mesko, N., Morrison, J., Tumbahangphe, K. M., Tamang, S., et al. (2004) Effect of a participatory intervention with women's groups on birth outcomes in Nepal: cluster-randomised controlled trial. *The Lancet* 364(9438) 970–979

Mathole, T., Lindmark, G., and Ahlberg, B. M. (2005) Competing knowledge claims in the provision of antenatal care: a qualitative study of traditional birth attendants in rural Zimbabwe. *Health Care for Women International* 26(10), 937–956

Mays, N., and Pope, C. (2000) Qualitative research in health care. Assessing quality in qualitative research. *British Medical Journal* 320(7226) 50–52

Mgawadere, F. M. (2009) Assessing the Quality of Antenatal Care at Lungwena Health Centre in Rural Malawi. PhD thesis: University of Malawi

Myer, L., and Harrison, A. (2003) Why do women seek antenatal care late? Perspectives from rural South Africa. *Journal of Midwifery & Women's Health* 48(4) 268–272

National Bureau of Statistics (NBS), and Macro (2011) Tanzania Demographic and Health Survey 2010. Dar es Salaam

National Bureau of Statistics (NBS) (2013) National Population and Housing Census. Dar es Salaam.

Nayyar, D. (2012) The MDGs after 2015: Some reflections on the Possibilities, Paper prepared for the UN System Task Team on the Post-2015 UN Development Agenda.

Nyamtema, A. S., Urassa, D. P., and Van Roosmalen, J. (2011) Maternal health interventions in resource limited countries: a systematic review of packages, impacts and factors for change. *BMC Pregnancy and Childbirth* 11(1) 30

Nygren, A. (1999) Local Knowledge in the Environment-Development Discourse: From dichotomies to situated knowledges. *Critique of Anthropology* 19(3) 267–288

Pembe, A. B., Carlstedt, A., Urassa, D. P., Lindmark, G., Nyström, L., and Darj, E. (2010) Quality of antenatal care in rural Tanzania: counselling on pregnancy danger signs. *BMC Pregnancy and Childbirth* 10, 35

Pigg, S. (1995) Acronyms and effacement: traditional medical practitioners (TMP) in international health development. *Social Science & Medicine* 41(1) 47-68

Polanyi, M. (1958) Personal knowledge: towards a post-critical philosophy. Chicago: University of Chicago Press

Powell, M. (2010) Which knowledge? Whose reality? An overview of knowledge used in the development sector. *Development in Practice* 16(6) 518-532

Preston, R., Waugh, H., Larkins, S., & Taylor, J. (2010) Community participation in rural primary health care: intervention or approach? *Australian Journal of Primary Health* 16(1) 4–16

Rifkin, S. (1990) Community participation in maternal and child health/family planning programmes: an analysis based on case study materials. Geneva: WHO

Roggeveen, Y., Birks, L., J, van K., Manyama, M., Hatfield, J., Bunders, J. F. G., Scheele, F., et al. (2013) Low utilization of skilled birth attendants in Ngorongoro Conservation Area, Tanzania: a complex reality requiring action. *Health* 5(7) 71-83

Rosato, M., Laverack, G., Grabman, L. H., Tripathy, P., Nair, N., Mwansambo, C., Azad, K., et al. (2008) Alma-Ata: Rebirth and Revision 5 Community participation: lessons for maternal, newborn, and child health. *The Lancet* 372, 962–71

Roth Allen, D. (2004) Managing motherhood, managing risk: fertility and danger in west central Tanzania. University of Michigan.

Say, L., & Raine, R. (2007) A systematic review of inequalities in the use of maternal health care in developing countries: examining the scale of the problem and the importance of context. *Bulletin of the World Health Organization* 812–819

Souza, J. P., Gülmezoglu, A. M., Vogel, J., Carroli, G., Lumbiganon, P., Qureshi, Z., Costa, M. J., et al. (2013) Moving beyond essential interventions for reduction of maternal mortality (the WHO Multicountry Survey on Maternal and Newborn Health): a cross-sectional study. *The Lancet* 381(9879) 1747–55

Spangler, S. A. (2012) Assessing skilled birth attendants and emergency obstetric care in rural Tanzania: the inadequacy of using global standards and indicators to measure local realities. *Reproductive Health Matters* *20*(39) 133–141

Starrs, A. M. (2006) Safe motherhood initiative: 20 years and counting. *The Lancet* 368(9542), 1130–2

Thaddeus, S., and Maine, D. (1994) To far to walk: maternal mortality in context. *Social Science & Medicine* 38(8) 1091–1110

Van Roosmalen, J., Walraven, G., Stekelenburg, J., and Massawe, S. (2005) Editorial: integrating continuous support of the traditional birth attendant into obstetric care by skilled midwives and doctors: a cost-effective strategy to reduce perinatal mortality and unnecessary obstetric interventions. *Tropical Medicine & International Health* 10(5) 393–394

Vandemoortele, J. (2011) The MDG Story: Intention Denied. *Development and Change 42*(1),1–21

Vandemoortele, J., & Delamonica, E. (2010) Taking the MDGs beyond 2015: hasten slowly. *IDS Bulletin* 41(1) 60–69

Villar, J., Ba, H., Piaggio, G., Lumbiganon, P., Belizán, J. M., Farnot, U., Al-mazrou, Y., et al. (2001) Articles WHO antenatal care randomised trial for the evaluation of a new model of routine antenatal care. *The Lancet* 357(9268) 1551–1564

Von Both, C., Flessa, S., Makuwani, A., Mpembeni, R., and Jahn, A. (2006) How much time do health services spend on antenatal care? Implications for the introduction of the focused antenatal care model in Tanzania. *BMC Pregnancy and Childbirth* 6:22

WHO. (2004) Making pregnancy safer: the critical role of the skilled sttendant. A joint statement by WHO, ICM and FIGO. WHO: Geneva

Wijssen, F., and Tanner, R. (2002). I am just a Sukuma: globalization and identity construction in Northwest Tanzania. Rodopi Bv Editions: Amsterdam/New York

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