How did formative research inform the development of a women's group intervention in rural Nepal?

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Abstract

Inability to reduce neonatal and maternal mortality in poor countries is sometimes blamed on a lack of contextual knowledge about care practices and care-seeking behavior. There is a lack of knowledge about how to translate formative research into effective interventions to improve maternal and newborn health. We describe the findings of formative research and how they were used to inform the development of such an intervention in rural Nepal. Formative research was carried out in four parts. Part 1 involved familiarization with the study area and literature review, and parts 2, 3 and 4 involved community mapping, audit of health services, and qualitative and quantitative studies of perinatal care behaviors. Participatory approaches have been successful at reducing neonatal mortality and may be suitable in our context. Community mapping and profiling helped to describe the community context, and we found that community-based organizations often sought to involve the Female Community Health Volunteer in community mobilization. She was not routinely conducting monthly meetings and found them difficult to sustain without support and supervision. In health facilities, most primary care staff were in post, but doctors and staff nurses were absent from referral centers. Mortality estimates reflected under-reporting of deaths and hygiene and infection control strategies had low coverage. The majority of women give birth at home with their mother-in-law, friends and neighbors. Care during perinatal illness was usually sought from traditional healers. Cultural issues of shyness, fear and normalcy restricted women's behavior during pregnancy, birth and the postpartum period, and decisions about her health were usually made after communications with the family and community. The formative research indicated the type of intervention that could be successful. It should be community-based and should not be exclusively for pregnant women. It should address negotiations within families, and should tailor information to the needs of local groups and particular stakeholders such as mothers-in-law and traditional healers. The intervention should not only accept cultural constructs but also be a forum in which to discuss ideas of pollution, shame and seclusion. We used these guidelines to develop a participatory, community-based women's group intervention, facilitated through a community action cycle. The success of our intervention may be because of its acceptability at the community level and its sensitivity to the needs and beliefs of families and communities.

Introduction

Maternal and neonatal health has received increasing attention as mortality rates refuse to fall in the poorest populations. More than two-thirds of all newborn deaths occur in just 10 countries, the same countries in which more than 60% of maternal deaths occur.[1] There are also disparities within these countries: a review of 48 demographic and health surveys from 1995 to 2002 found that in low and middle income countries, the poor families suffer a neonatal mortality rate from 19 to 44% higher than the richest.[2] If these figures are to improve, it is necessary to develop interventions that meet the health needs of disadvantaged women and newborn infants. This has been recognized internationally in Millennium Development Goals 4 and 5.[3]

The development of interventions to reduce maternal and neonatal morbidity and mortality requires knowledge of the context in which the poorest families make decisions on their health. Although poverty, quality of care and physical access barriers must be addressed, most maternal and neonatal deaths occur in the home, and a lack of understanding of local beliefs and practices (and the reasons for them) can hinder the development of appropriate interventions.[4] Formative research and participation of community-based stakeholders in design, implementation and evaluation of interventions can increase the possibility that effective, acceptable and sustainable interventions are developed.

Formative research in maternal and newborn health ranges from description of practices and beliefs[5,6] to rapid rural assessment of local needs,[7,8] the latter being more easily linked to intervention development but the former providing more depth and explanation. Formative research can provide detailed information about existing newborn care practices and the reasons for them, a discovery process which allows community members and researchers to learn together.[9] The process can help to open a dialogue about how communities wish to improve maternal and neonatal health. Together, community members and researchers can identify factors working against optimal health and build potential solutions.

We describe the formative research undertaken to design an intervention to improve maternal and newborn health in rural Nepal. We present some of the results of this research and discuss how our findings contributed to the design and implementation of the intervention. The final intervention was low cost and participatory.[10] Local women facilitated 111 groups of women and enabled discussion and community action to improve maternal and newborn health. Mortality fell by 30% in intervention areas, and there were significant positive effects on home care and health care-seeking behavior.[11]

Methods

Setting

Nepal is a poor country in South Asia known for its mountains, ethnic diversity and more recently the effects of a civil war that has killed more than 12 000 people in just over a decade. Nepal has a per capita gross national income of $270, a life expectancy of 62, and 86% of the population live in rural areas.[12] Female literacy is steadily improving (55% are literate), although in rural areas, literacy is lower. In all, 53% of the female population have not attended school. The number of women using a skilled birth attendant is low (19%), and the neonatal mortality rate is high (33),[12] and many women have limited access to emergency obstetric care facilities. The trial was conducted in Makwanpur district, which lies south of the capital city, Kathmandu. Makwanpur was selected for its mix of *terai* (plain) and *pahaad* (hill) areas, and had a mid-range human development index of 0.309.[13]

Village Development Committees in Makwanpur district were pair matched for topography, ethnicity and population density, after which 12 pairs were randomly selected to be part of the trial. One village development committee per pair was randomly allocated to receive the intervention and the other acted as a control. An office was set up in the district center, Hetauda, and the design and implementation of the trial were carried out by MIRA (Mother and Infant Research Activities, a Nepalese nongovernmental research organization) with technical support from the Institute of Child Health, University College London. Ethical permission was granted by the Nepal Health Research Council, locally elected leaders, the District Public Health Office, the Government of Nepal and the ethics committee of the Institute of Child Health and Great Ormond Street Hospital.

Part 1: entry and framework

Formative research was conducted in the 24 Village Development Committees participating in the trial and consisted of four parts (Table 1). The two linked objectives of the first part were to build a network of stakeholders in Makwanpur and to crystallize the type of intervention that would be implemented. An advisor to MIRA also conducted MSc thesis research in the district to build an initial profile.[14] A structured literature review was conducted to gather information about the district and about community-based research for neonatal health in Nepal and internationally. Nongovernmental organizations working in safer motherhood were visited, and links made with the national safer motherhood initiative managed by the Ministry of Health.

Part 2: enumeration, demography, care and outcomes

The objectives of the second part of the formative research were to enumerate and describe potential beneficiaries and to quantify care behaviors and birth outcomes. MIRA employees made field maps of each ward in the 24 Village Development Committees (nine wards per committee). The maps depicted every household, path, temple, health institution, river and community building, and were drawn with the help of community leaders and community-based organizations. A profile of every village development committee was compiled, including organizations working there, their activities and the names, locations and expertize of traditional healers. We identified and mapped 28 376 households between September 1999 and June 2000, collecting socioeconomic status data and identifying married women of reproductive age. Each woman was visited to complete an individual questionnaire, including questions about newborn care during any preceding birth. The questionnaire was developed through 11 cycles of piloting, evaluation and repeat piloting. In all, 10% of interviews were observed. Questionnaires were checked and amended at source, at field centers and at the central office. Data were entered into a relational database in Microsoft SQL server 7.0, with intrafield and interfield constraints. Frequencies, outliers and proportions were analyzed after exporting data to Stata 5.0.[15]

Part 3: availability of services

The third part was an audit of health services, equipment, personnel and consumables for perinatal care in the study area. After piloting, 24 health facilities were visited (16 subhealth posts, five health posts and three primary health centers). Secondary data were collected from registers, and triangulated through semistructured interviews with health personnel and analysis of companion reports. Data were entered and analyzed in Microsoft Excel 98.

Part 4: in-depth studies

The fourth part was a qualitative study of care practices and beliefs during pregnancy, birth and postpartum.[16,17] We explored care practices in 'normal' birth outcomes and in maternal and perinatal deaths. Six Village Development Committees were sampled to be

heterogeneous with respect to topography and demography. Local women helped to convene 27 focus group discussions about care practices during births where both mothers and infants had survived, and 24 focus group discussions exploring the language of pregnancy and the puerperium. Discussions were conducted with homogeneous gender and ethnic groups, facilitating discussion using a pictorial timeline. We also developed case studies about women and infants who had suffered problems (Table 2). Two to four semistructured interviews were taken for each case study, and informants were selected on the basis of the initial interview. Field notes and diaries supplemented tape-recorded data. An independent party translated a random selection of the data into English, and technical advisors completed the remainder. Senior staff and technical advisors analyzed the data by categorizing into emergent themes.

Results

Part 1: entry and framework

Linkages with the government primary health care system were established, a memorandum of understanding was signed and Village Development Committee representatives agreed to the program. Literature review and discussions with experts in development and research gave us an understanding of existing work about community maternal and newborn survival, and enabled the parameters of the intervention to be sketched.

The literature—particularly the trials by Bang and colleagues[18] in Gadchiroli, India, and our neighbors in the district of Sarlahi, Nepal[19]—provided evidence that maternal and newborn mortality could be reduced by intervening at the community level. In Bolivia, the Warmi project was also community based and had reported a reduction in perinatal mortality.[20,21] Although this project was not a randomised control trial, and was implemented in a relatively small population, it demonstrated a potentially sustainable delivery mechanism using local women's groups. Groups participated in a community action cycle to define local problems and work with their communities in addressing the needs of women and newborn infants. The success of this methodology was compared to our trial of health education in urban Kathmandu, Nepal, which showed no significant impact on a number of variables.[22]

In Nepal, participatory approaches have been tried with varying success.[23] Evidence suggests a sustained successful participatory approach in the forestry sector. Local forest user groups (with female membership quotas) now manage forests that were previously managed nationally. Community forestry has been sustained since the initiation of local control.[24,25] Without local ownership, the success of externally initiated projects may be limited.[26,27] A participatory approach was also attractive because of its tolerance of diversity. Contextual differences within the study area might affect how an intervention is received. Participatory development practitioners believe that to transform society, local stakeholders should be active participants in problem identification, planning, implementation and evaluation.[28,29] Through participation, a collective critical consciousness is developed. Interaction with those of common situation, belief and purpose enables individuals and groups to become empowered to work toward change. Knowledge is developed through a process of action and reflection, and this deeper understanding stimulates action.[30,31] This action often involves challenging existing power relations and social structures and can be a difficult process.

Part 2: community profiles, enumeration, care and outcomes

Community profiling gave us an understanding of the services, groups and nongovernmental organizations active in the study area. We learnt about the kind of experience our study area

had had with nongovernmental organizations. We also learnt that women's groups were quite common and less likely to be opposed by community members.

Of particular interest were the activities of female community health volunteers (FCHVs). Many organizations sought to involve her in their programs. One of her duties is to run monthly women's groups. In practice, women's groups were often not functioning, or health volunteers reported running groups at outreach clinics. Observations showed that this often meant the dissemination of health messages to women attending these clinics. Volunteers found it difficult to sustain a regular women's group without regular training, supervision, an agenda and health education tools.

The results of the census and survey activities have been presented elsewhere.[15,17] In all, 90% of women gave birth at home. Attendance at delivery by skilled government health workers was low (6%), as was attendance by traditional birth attendants (TBAs; 5%). Only 8% of women had used a clean home delivery kit, and about half of attendants had washed their hands. A total of 64% newborn infants had been wrapped within half an hour of birth, and 92% had been bathed within the first hour. A total of 99% of babies were breastfed, 91% within 6 h of birth. 77% of women who recalled a perinatal illness sought help from the traditional healer.

Part 3: availability of services

District health services involve a hierarchy of facilities and personnel. Each level serves as a referral point for the one below. The Sub-Health Post functions as the first institutional contact point, but in practice, is a referral point for TBAs and FCHVs, and a venue for community-based activities. The Sub-Health Post is a nodal point for preventive, curative and referral services. There is roughly one health facility per Village Development Committee, so the first point of consultation may be a Health Post or a Primary Health Center. Table 3 shows the cadres of health personnel involved in perinatal care.

Although most primary care staff were in Post, doctors and staff nurses were absent from referral centers. Mortality estimates by service providers were low, reflecting underreporting of deaths. Tetanus toxoid coverage was reasonable but supply, and coverage of iron and folic acid supplements was poor. Hygiene and infection control were major problems, with low utilization of clean home delivery kits and limited antibiotic supplies at health facilities.

Part 4: in-depth studies

Some of the findings of the extensive qualitative work have been published.[16,17,32] We gained a fair understanding about the contextual factors that should guide the development of the intervention. Key issues included the activities of the community carers for maternal and newborn health, the dynamics of care seeking, and the community knowledge base.

Community care providers for maternal and newborn health

We identified three types of individual with professional inputs to maternal and infant care in the community: traditional healers, TBAs and FCHVs. Only the latter was formally located in the public health system.

Field staff collated the names, locations and expertize of traditional healers. We found that there was variety in the type of work that each could perform, and that their reputations varied. A hierarchy of reputations contributed to decisions about which healer was called and when. Often a healer who was a friend or relative was called first to perform a small blessing. If the condition worsened, the services of a '*thulo*' (great) healer would be sought. The reputable healer was perceived to be more powerful and could perform animal sacrifice,

but might live further away and charge more. An example of a neonatal death illustrates this pattern of care: the first healer to treat the sick baby was the paternal grandfather. The next day, when there was no improvement, the baby was taken to another traditional healer in Nawalpur who performed a ceremony for an entire day. Unfortunately, the baby died while the family was returning home.

The policy of TBAs was introduced in Nepal with support from international donors. Support for the program waned when their effectiveness was difficult to evaluate and the safe motherhood agenda of increasing facility deliveries was prioritized. Therefore, recruitment and training of TBAs were inconsistent in the study area and they were not routinely or traditionally used. TBAs were not always selected on the basis of their interest or motivation to help women during pregnancy and childbirth, and this affected their likelihood of attending births. Political or personal allegiance also limited their effectiveness; 'we inform them of the birth but they don't come; this is because of politics' (Tamang ethnic focus group discussion). We found that TBAs tended to be called only if problems had escalated to a critical situation. Generally, there was no perceived advantage in TBAs attending births instead of a relative. There was also a fear of attracting evil spirits if outsiders knew that women were in labor.

We found that TBAs were reluctant to attend births because the situation might already have become serious by the time they arrived. This left them open to blame in the event of death or disability.[6,33,34] Another important consideration was the ethnodiagnostic need to assign a cause for an illness. Without clear assignation of the pathway of causation, treatment might not be satisfactory. Unfortunately, TBAs were unable to satisfy this need, which was the province of traditional healers.

The involvement of FCHVs in running mothers' groups has already been mentioned. There is roughly one FCHV per 7000 population. On recruitment, she should be married and literate, and have 24 days of training from the District Public Health Office. They are unpaid workers but are given some funds to buy medicines and contraceptives as a small business platform. They are under line supervision by Village Health Workers. Besides group facilitation, they are expected to conduct health promotion, support immunization outreach, provide some first aid, and distribute oral rehydration salts, iron supplements, vitamin A and contraception. In areas where volunteers were actively supported by an international nongovernmental organization (Nepal Family Health Program), they were working well to diagnose and treat pneumonia in infants.[35,36] Contraception, and oral rehydration salts were distributed informally, through visits to the houses of community members.

The dynamics of care seeking

Qualitative data revealed some of the reasons for delays in seeking care. Key issues included the hierarchy of decision makers, the concept of pregnancy, birth and pain as normal, the shyness that surrounds pregnancy and the postpartum period, the vulnerability of pregnant women and newborn infants and the ascription of cause.

When a problem occurred during labor or postpartum, decisions about appropriate action were based on advice from family members, neighbors and traditional healers: A woman who was about to deliver, was advised by primary health care personnel to go to a hospital in Kathmandu. Her mother-in-law resisted, saying 'this is not a problem, when I was pregnant I also had this, it is upside down now, but later it will be ok.' After a difficult labor, the baby was born dead. This case reflects the position of daughters-in-law in the extended family, and also indicates the social nature of decision making during illness. It was also common for families to ask for money from friends and neighbors to seek care, which

increases the potential for advice and opinion to be given by those outside the immediate family.

The perception that pregnancy, birth and pain were normal appeared to prevent women from seeking care during illness. A woman whose premature twins died shortly after birth said: 'I had pain, strong stomach pain and couldn't sleep (at about 7 months gestation). The next day the pain was there, I plastered the house hoping the pain would go, but I did not tell anyone, I thought, maybe this is normal' (case study). Likewise, a father mourned for his dead daughter-in-law and stillborn grandchild: 'if she was ill and had slept in the bed we could easily have treated her, but she never told anyone about her illness, she always worked' (case study).

A further hindrance to care seeking might be embarrassment or shame (*laaj*): 'we don't tell people of our pregnancy or go to see others, we are shy' (Newar ethnic focus group discussion). Feelings of *laaj* and fear of bringing shame or misfortune on the family often prevented women from revealing pregnancy. Menstruation, pregnancy, childbirth and the period thereafter are unclean, shameful and polluting. Women must abide by rules that restrict or purify this pollution to ensure that it does not endanger the family or affect their rebirth in the next life.[37] More prosaically, young women—and women with many children —were wary of judgement and disapproval by health service providers. This tended to discourage antenatal care. It was difficult for families to make special provisions for pregnant women (for example, working less, carrying less, or eating more food), if they were unaware of the pregnancy. We found that feelings of *laaj* sometimes prevented women from seeking care for problems quickly.

Added to this was the fear of attracting evil spirits. Practices and rules exist to restrict behavior and protect women during vulnerable periods, such as pregnancy, and after childbirth when they are believed to be particularly vulnerable to evil spirits and ghosts. By acting shamefully and not abiding by social norms of appropriate behavior, women were believed to attract evil spirits or ghosts. During the postnatal period, the mother (*sutkheri*) and her baby were often secluded and considered polluted until after the cleansing and naming ceremony of *nwaran*. Seclusion is believed to contain pollution and protect mother and baby from evil spirits. Illness can also arise if another family member has broken the rules or there is a bad relationship between the family and a god.

Illness was not seen as having a linear relationship between symptom and cause, and cure involved a process of elimination of a variety of different causes, which might involve the entire family.[38] The decision to seek care outside the home was made after a series of home remedies had been tried and the woman had been observed carefully. Many families waited to see whether a cure had worked before exploring other causes of illness or other sources of help: 'we watch and wait for one day' (Magar ethnic focus group discussion). The traditional healer played a key role in identifying possible causes and therefore could not be bypassed in the pursuit of a cure: 'before we do anything, we will take suggestions from the Dhami (healer) and then go to the hospital' (case study); 'if you are pregnant and touched by a ghost, you have to go to the Dhami Jankhri (healer)' (Dami ethnic focus group discussion).

The community knowledge base

An important finding was that lack of knowledge about appropriate preventative or care behaviors was not always a problem. Sometimes, women knew that it was beneficial for pregnant and postpartum women to eat more and to eat nutritious food, but they were unable to afford these special provisions. Financial barriers and perceived cost of care at health institutions restricted implementation of knowledge: 'if there is money, (we) go for a check-up at this time (during pregnancy)' (Praja ethnic focus group discussion). We found that

some women knew that they should work less while pregnant—'we shouldn't climb trees or steep slopes… if you carry heavy loads, you will bleed' (Kami artisanal focus group discussion)—yet, socioeconomic realities prevented them from taking adequate rest: 'we can rest, but not in the village' (Tamang ethnic focus group discussion).

Although we did not test knowledge formally in the formative research, we could draw some inferences. Women spoke of more neonatal health problems than men, but both men and women identified a number of danger signs (weak or no cry, weak or no breathing, weak or no suckling, cold to touch, looks very small, looks yellow). When identification of problems was examined by ethnic group, it was evident that there were gaps in knowledge. Our tentative inference was that neonatal danger signs were known, but levels of knowledge varied between ethnic groups and geographical locations.

Discussion

We took a participatory approach to formative research. By consulting community members and respecting local knowledge and decision-making processes, we demonstrated our willingness to learn. By learning from community members, the senior field staff saw themselves as equal participants in the formative process. Community members may have shared this perception. Senior field staff learned good communication and negotiation skills, how to deal with differences of opinion in participatory decision making and skills in active listening. Through a participatory approach, we achieved the aims of the formative research and created good rapport with the study population. Rich contextual knowledge and partnership with potential beneficiaries were general outcomes of our approach. More specific outcomes were the answers to four questions: (1) Who should implement the intervention? (2) What should the intervention address? (3) Who should be the major stakeholders in the intervention? and (4) What should the intervention be?

Who should implement the intervention?

Using existing community structures as far as possible would maximize the potential for sustainability, but we felt that it might be difficult to work solely with traditional healers or community health volunteers. A focus on the healer as the deliverer of the intervention might have made it difficult to encourage the use of health services and maintain good relations with health providers. TBAs were reluctant to attend births and could not satisfy the ethnodiagnostic needs of families. Political interest in TBAs was low, and in Makwanpur district, there was no traditional basis for involving them. Many FCHVs in the district were not running regular women's groups as they were difficult to sustain over time without regular training and supervision, an agenda and health education tools. They were also burdened with different agendas from many non-governmental organizations, and therefore, there was potential for them to be overworked and unfocussed. Joint management of volunteers by MIRA and the government of Nepal would also be difficult to negotiate, particularly as they were unsalaried. To strengthen supervision and government support would require intensive inputs and fundamental changes at the central level—for example, changes in the time allocation of their line managers, allocation of resources to development of materials, monitoring, payment of a salary, recruitment and retraining.

What should the intervention address?

Evidence suggested that an intervention should tackle delays in care seeking by addressing the familial context. The evidence suggests that care seeking is often a social process whereby advice from different parties is sought and different options are explored.[39,40] The interaction of shame, fear, vulnerability, seclusion and inertia is likely to cause delays in seeking care. Women's low status in the home may affect their ability to act on existing or

learned knowledge; it would take great courage and personal strength for her to challenge tradition. Therefore, we needed to build an intervention that addressed women's empowerment, and that facilitated a change in the social context in which women and families make decisions. To enable women and families to access health care and talk about pregnancy and maternal health, an intervention should aim to create an open forum within which problems could be talked about. An intervention that directly challenged tradition (with the attendant risks of affecting rebirth of family members in the next life) might be inappropriate. Good facilitation skills and a sound understanding of local contexts would be needed to enable the integration of new knowledge with traditional knowledge.

Lack of knowledge was not always the problem, and therefore, the intervention should take a multifaceted approach: enabling locally appropriate knowledge development and enabling women to address the barriers preventing them from acting to improve their health. Formative research suggested that the intervention should address negotiations within families, and family knowledge development—not only individual women. Knowledge about newborn and maternal health varied according to place, ethnicity and gender, and therefore, the intervention should be flexible to accommodate knowledge development as and where appropriate. Participatory approaches allow for diversity and adaptation to local circumstances as communities and researchers design interventions together. Critically aware community members are best placed to decide how social change can be initiated, and therefore researchers and community members can combine their skills to build an intervention for social change.

Who should be the major stakeholders in the intervention?

Women's group meetings were quite common, and therefore less likely to be met with opposition from community members. The evidence suggested that focus should be on pregnant women, the family and the community environment. Family and neighbors were most likely to attend a woman in childbirth and often gave advice during illness. This potential for societal influence could be exploited, creating social pressure for changes in practice. A social program that enabled community interaction, and one which took advantage of the social definition of illness could be effective. Utilization of peer learning and peer pressure was also identified as a potential delivery mechanism in this social context.

What should the intervention be?

The design of the intervention was based on the Warmi model, whereby groups of women met regularly to work through an action cycle of problem identification, planning together with their community and implementation and evaluation of strategies addressing prioritized problems. There were no specific inclusion criteria for women's groups as we sought to build a forum where mothers-in-law and daughters-in-law could talk together. Women's groups were helped through this process by the local FCHV and a local woman facilitator recruited and paid by MIRA. By supporting the FCHV, we hoped to reactivate her and increase her skills and credibility. The facilitator was educated to primary school level, was literate and had received training in facilitation skills from MIRA. She used a manual to help her guide the discussion and was supported and supervised by a field supervisor (one supervisor per three facilitators). To support the FCHV strategy, facilitators tried to arrange group meetings with them, and followed the government suggestion of one meeting per month. Volunteers were encouraged to keep the group meeting register and submit the meeting minutes to their supervisors at monthly meetings.

To avoid raising expectations, the groups were introduced to the aims of the intervention, and then discussed and prioritized perinatal health problems. Initially, it was important to

increase awareness of maternal and newborn health problems and develop the self-sufficiency of the group. This self-realization, or critical consciousness, would stimulate the group to seek ways of addressing their problems. Although there was a need to increase knowledge, there were other more salient barriers to care seeking. Therefore, we decided that giving knowledge or 'messages' at this stage would be the wrong approach to take.

After prioritizing problems, the groups presented their work at a community meeting. This enabled the wider community to be involved in the process, and stimulated discussion of perinatal health among families and neighbors. After the community meeting, the groups started maternal and child health funds, managed or bought stretchers, and made and distributed clean home delivery kits. Participants had difficulty linking problems with potential solutions, and therefore, a participatory learning tool (the perinatal picture card game) was developed. Using this tool, group members could explore preventative, home care and referral options in their local area. Detailed discussion about the women's groups is available elsewhere.[32]

Conclusion

We have shown that the depth of knowledge generated by a broad range of formative research enabled us to better understand the context of the study area, and was beneficial in explaining the high levels of newborn and maternal mortality. Strong preference for care in the community and lack of health service utilization led us to believe that the intervention must be locally based. We found that facilitating social change and women's empowerment was necessary, and that introducing new knowledge was of slightly less importance. A participatory approach was identified to enable a community-based, community-responsive intervention to be initiated. The intervention was uniform across the study area in its goal and method, but diversity of culture, knowledge, topography, language and ethnicity was acknowledged through the participatory approach.

We have found our approach—both during the formative research, and in the development of the intervention—a productive way of working with communities to address their problems. In intervention areas, large reductions in neonatal mortality and maternal mortality were observed, and there was increased care seeking for health problems. Care behaviors in intervention areas also improved, and groups continued to meet regularly. The extent of knowledge gained or critical consciousness developed has not been measured explicitly, but a retrospective evaluation that has been carried out may offer some possible explanation. By working with the communities in the study area and listening to their needs, we may have succeeded in building an intervention that is acceptable. The success of interventions to reduce neonatal and maternal mortality may depend on their ability to work with communities in facilitating change.

Acknowledgments

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Table 1

Formative research conducted before the intervention

Part	Formative research
Part 1: entry and framework	Familiarization visit Introduction and contact with District Public Health Office Literature review Dialogue with maternal and newborn health actors
Part 2: community profiles, enumeration, care and outcomes	Community mapping Village Development Committee profiling: key individuals and organizations working in the area Census and enumeration of married women of reproductive age Survey of past pregnancy outcomes, perinatal care and demographics
Part 3: availability of services	Audit of services, human resources, equipment and consumables for perinatal care at local health facilities
Part 4: in-depth studies	Qualitative study of care practices and beliefs during pregnancy, birth and postpartum for normal birth outcomes and for maternal and perinatal deaths

Table 2

Case studies

Case	Number of studies
Problem during pregnancy in preceding 2 months	2
Neonatal illness in preceding 2 months	2
Neonatal death in preceding 2 years	10
Stillbirth in preceding 2 years	8
Maternal death in preceding 5 years	8
Total	30

Table 3

Government health personnel in Makwanpur district

Institution	Paid government personnel	Volunteers
Primary health center	Medical officer (1) Staff nurse (1) and health assistant (1)	Female community health volunteer
	Auxiliary nurse midwife (3) and auxiliary health worker (2) Assistant accountant (1) Laboratory assistant (1) Peon (2) and sweeper (1)	Traditional birth attendant
Health post	Health assistant (1) Auxiliary health worker (1) and auxiliary nurse midwife (1) Village health worker (1) Head clerk (1) Peon (1)	Female community health volunteer Traditional birth attendant
Sub-health post	Auxiliary health worker Village health worker (1) and Maternal child health worker (1) Peon (1)	Female community health volunteer Traditional birth attendant