

Evaluation of a community-based intervention for health and economic empowerment of marginalized women in India

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Abstract

Background Empowered women have improved decision-making capacity and can demand equal access to health services. Community-based interventions (CBI) based on building women's groups for awareness generation on maternal and child health (MCH) are the best and cost-effective approaches in improving their access to health services. The present endeavour evaluates a community-based intervention aimed at improving marginalized women's awareness and utilization of maternal, and child health services, and access to livelihood and savings using the peer-led approach from two districts of India. Methods We used peer educators as mediators of knowledge transfer among women and for creating a supportive environment at the household and community levels. The intervention was implemented in two marginalized districts of Uttar Pradesh, namely Banda and Kaushambi. Two development blocks in each of the two districts were selected randomly, and twenty-four villages in each of the four blocks were selected based on the high percentage of a marginalized population. The evaluation of the intervention involved a non-experimental, pre- and post-research design, using a mixed-method approach. Data were collected at three points in time, including a rapid assessment (quantitative and qualitative interviews) at baseline, qualitative interviews at the end line and tracking data of the intervention population (n=37,324) through an online management information system. Results Most of the women in Banda (90%) and Kaushambi (85%) attended at least 60% of the education sessions. Around 39% of women in Banda and 35% of women in Kaushambi registered for the livelihood scheme, and 94% and 80% of them had worked in these two places, respectively under the scheme. Women during group discussions informed that their awareness about MCH increased post-intervention. The money earned after getting work under the livelihood scheme or from daily savings was deposited in the bank account by the women. These savings helped the women investing money at times of need, such as starting their work, in emergencies for the medical treatment of their family members, education of their children, etc. Conclusion Peer-led model of intervention can be explored to improve the combined health and economic outcomes of marginalized women.

Background

India achieved groundbreaking success in reducing maternal mortality by 77% from 556 (1990) to 130 per 100,000 live births in 2016.^{1,2} However, India is still far from reaching the Sustainable Development Goal's (SDG) target of reducing the Maternal Mortality Ratio (MMR) to less than 70 per 100,000 live births by 2030.¹ Only three states in India have been able to reduce MMR to less than 70 per 100,000 live births so far.³ In the move to accelerate the pace of achievement of the SDG, NITI Aayog (the think tank of the Government of India) has spearheaded the health index initiative with the Ministry of Health and Family Welfare. Nearly half of the Indian states or union territories had an index score of 50 or less than 50 out of 100 in the health index initiative. This reflects poor health outcomes and health system performance and service delivery indicators across half of the states or union territories in India.⁴

The Government of India adopted multiple strategies to improve maternal health and reduce MMR. These strategies included improving access to quality maternal health services, introducing conditional cash transfer schemes, such as maternity benefit scheme, and cashless delivery scheme, mitigating social determinants of maternal health, and promoting public-private partnerships.¹ The evidence state that increased access by women to quality maternal and perinatal health services is essential for improving maternal and perinatal outcomes, including reduced maternal deaths.⁵

It is well known that social and structural determinants of maternal health influence the access to and use of maternal and reproductive health care services.^{6,7} Studies indicate that social and economic disparities critically affect the utilization of health services amongst other determinants of maternal health.^{8,9} Socially disadvantaged populations are often challenged by long distances to health facilities, poverty, ignorance, and poor health literacy.^{10,11} Other studies have shown that woman's educational attainment, age at marriage, access to livelihood, access to savings, and decision-making power influence utilization of health services.¹²⁻¹⁵

Community-based interventions that disseminate education and promote awareness related to maternal and child health care based on building women's groups (peers) are best for improving access to health services.¹⁶ Peers in the communities have an important role to play in transforming the health practices of women. Multiple studies have proven the effectiveness of peers in community-based interventions for educating women and improving the health status of the mother and children.¹⁷⁻¹⁹ Community engagement is central to community-based interventions, and a cost-effective tool for sustained behavior change.^{16,20} Community engagement has been a widely used strategy in health promotion, involving communities in decision-making, planning, and delivery of services.²¹ It has been widely used for marginalized populations as it engages with the community at all levels, enables knowledge transfer exchanges and addresses power imbalances.²²

While the effect of peer-based interventions in improving awareness and utilization of maternal and child health services have been well described, most of these interventions are limited to health education approaches. There is limited evidence for the effect of peer-based interventions in jointly improving awareness and utilization of maternal and child health services, and access to livelihood and savings using education and livelihood promotion approaches. We conducted this study to identify perceived changes in the awareness and utilization of maternal and child health services and access to livelihood and savings after a three-year intervention. Besides, we wanted to assess the change in the perceptions and practices of the relevant stakeholders influencing the uptake of maternal and child health services and livelihood by women. This paper shows the mixed-method evaluation of this community-based intervention from two districts in India. Access to livelihood was assessed by linkage with a government-sponsored wage employment scheme, Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA scheme), which aims at providing livelihood security to the rural poor.²³ MGNREGA scheme supports livelihoods by guaranteeing cash payments for work. Under the scheme, every household has a legal right to access 100 days of work per year to generate public assets, such as water harvesting

structures, irrigation facilities and other livelihoods infrastructure intended to benefit communities.²⁴ Access to savings was assessed as having an account in a bank or in a post-office.

Description of the intervention

Intervention settings

The intervention was implemented in two marginalized districts of Uttar Pradesh, namely Banda and Kaushambi. Uttar Pradesh, an empowered action group state, lags behind most of the states in the country in terms of the major indicators of health, social, and economic development.²⁵ The two districts (Banda and Kaushambi) were chosen randomly from the list of the districts in Uttar Pradesh falling under the category of low or very low human development index.²⁵ Banda is situated to the south of the capital of Uttar Pradesh and has a population of 1.8 million, 66.6% literacy rate and a sex ratio of 863.²⁶ Situated south-east to the capital of Uttar Pradesh, the district Kaushambi has a population of 1.6 million, 61% literacy rate and a sex ratio of 908, which is lower than the state and national averages.²⁶ Two development blocks in each of the two districts were selected randomly for the intervention. All the villages in the selected blocks were ranked based on a higher percentage of the marginalized population (defined as population belonging to scheduled caste, scheduled tribe, other marginalized classes, or below poverty line). The top twenty-four villages in the list from all the four blocks were chosen for the intervention. In total, the intervention was conducted in 96 villages from four blocks.

Objectives of the intervention

The specific objectives of the intervention were: a. to identify, map, and organize groups of women (15-35 years) from marginalized sections of society; b. to orient community health workers, midwives, and medical officers on segmentation and inclusive approach²⁷ for delivering focused care to marginalized populations on the issues of maternal and child health, gender, life-skills, and savings; c. to deliver health education sessions to women from marginalized sections using a peer-led approach with the support of community health workers and midwives; and d. to create an enabling environment for increasing women's access to health and livelihood by sensitizing community leaders, MGNREGA staff, husbands, and mothers-in-law. The theory of change for the intervention based on the community engagement model has been shown in Fig 1. The proposed theory of change in our intervention was to improve awareness and utilization of maternal and child health services, and access to livelihood (MGNREGA) and savings by the marginalized women. In the community engagement approach we used peer educators as mediators of knowledge transfer and for creating a supportive environment at the household and community-level. In addition, to make this entire change sustainable, the strengthening of Village Health, Sanitation, and Nutrition Committees (VHSNC) was done. VHSNC are entrusted as a key mechanism for community health governance to ensure community participation in monitoring and quality delivery of health and nutrition services. Strengthening VHSNC is a step towards ensuring community engagement and sustainability in the change process of the community.²⁸

Intervention activities

The sequential flow of the intervention activities is shown in Table 1. The project aimed to reach up to a total of 37,324 women from marginalized sections of the two districts together. The groups of identified women were formed with each group containing 23-27 women. From within the group, one woman was selected a peer educator, who was educated up to high school (minimum qualification) and had leadership skills (assessed by outreach worker). There were 1,500 peer educators across both districts. All the peer educators were trained by outreach workers on a four-day module covering ten topics. These ten topics were related to issues around maternal and child health and financial literacy (saving money, managing household expenditure, and opening an account). Similarly, peer educators conducted sessions in the community with women on these ten topics. Peer educators paid home visits to women at the time of recruitment and in case of drop-outs during the intervention. Since, peer educators belonged to the same community, they had access to approach these women anytime (the exact number of home visits not recorded). Based on the intervention model, the various implementation actors were assigned their roles (Table 2).

The outreach workers facilitated the linkages of these women with the MGNREGA scheme. The community health workers, midwives, and MGNREGA staff were mobilized and oriented to sustain the process of knowledge transfer among marginalized communities as well as increased mobilization towards a better uptake of social-welfare schemes. The medical officers in the intervention areas were sensitized on an inclusive approach to deliver appropriate and quality maternal and child health services. The members of VHSNC were oriented and engaged for better coordination between community and health systems in addressing the needs of marginalized populations. Further, VHSNC were strengthened to prioritize the issues related to maternal and child health in their village health plans.

Various information, education, and communication tools were developed and used in the intervention: a flipbook with illustrations and key messages, a training module of ten chapters, and ten posters on maternal and child health. All the education tools were in the local language (Hindi). All the education tools were tested for relevance, face, content, and construct validity; the mention of those is beyond the scope of this paper. The sessions in flipbooks or chapters in the module included information on pre-pregnancy, antenatal, postnatal, and newborn care, child immunization, nutrition and growth, family planning, and financial literacy. The modules were meant for training of peer educators by outreach workers, and flipbooks were intended for use by the peer educators in the field while taking group sessions. The posters were used during community-based events.

The duration of each session by a peer educator in the field was two hours. The sessions began with a twenty-minute-discussion on the pictures shown in the flipbook followed by 60-80 minutes of discussion on the key messages related to the topic, and in the end, participants could ask queries. A question box was also kept in each session for the participants hesitant to discuss their issues in front of their peers. Women were advised to save money monthly in a piggy bank so that the saved money could be used for meeting the expenditures during delivery and the postnatal period.

Methods

2.1 Evaluation design

The evaluation of the intervention involved a non-experimental pre- and post-research design in community settings, using a mixed-method approach. No control group was present. The pre-intervention data were collected through rapid assessment (mixed-method research) at baseline from January to March 2013. The intervention was delivered over thirty-months from the start of April 2013 until the end of September 2015. The post-intervention qualitative data were collected and analyzed at the end of the intervention in October and November 2015. The evaluation was done on the same sites as the intervention.

2.2 Data collection

The pre-and post-intervention data collection was done on a sample of the population from the intervention sites. Besides, we tracked the intervention population (n=37,324) on certain quantitative indicators, and their data were captured in the routine management information system. The evaluation was conducted on all the relevant stakeholders engaged in the intervention, who provided consent and were available for the interviews. The stakeholders included young married women (15-35 years), peer educators, husbands and mothers-in-law of women, community health workers, midwives, medical officers, VHSNC members and MGNREGA staff. The data investigators before and during the intervention were outreach workers of the project. However, the post-intervention qualitative research was done by a team from the Department of Community Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi. To summarize, data were collected at three points in time, namely before the intervention (rapid assessment), during the intervention (quantitative data through management information system), and post-intervention (qualitative data).

2.2.1. Pre-intervention (Rapid assessment at baseline) study

We conducted a mixed-method study at the baseline to assess maternal and child health-related awareness and service utilization (antenatal, intranatal, and postnatal) among marginalized women. Further, information on the possession of bank or post-office account and work participation by the women under the major income-generating scheme of the government of India (MGNREGA) was collected. The pre-validated questionnaire used for the quantitative survey among young women (15-35 years) included questions on their socio-demographic characteristics, awareness on maternal and child health care (antenatal care, anemia, maternity benefit scheme, postnatal care, family planning methods, home-based care for diarrhea in new born, symptoms of pneumonia, child immunization, and safe abortion), awareness on national health insurance and MGNREGA schemes. In addition, we asked about the utilization of maternal and child health services (antenatal care, institutional delivery, postnatal care, early breastfeeding, child immunization, abortion, and family planning methods), possession of savings account, and work participation in the MGNREGA scheme.

Qualitative interviews were conducted to gain our understanding of the needs and perceptions of young married women (15-35 years) and the service providers on maternal and child health and family planning. In each district, one focus group discussion (FGD) was conducted each with pregnant women, lactating women, and community health workers and one in-depth interview (IDI) was performed with a medical officer. In addition, two IDI were done with the staff of the MGNREGA scheme to understand their perceptions about women's participation in MGNREGA (one in each district).

We employed multi-stage random and purposive sampling techniques to recruit participants for the quantitative survey and qualitative interviews, respectively. Based on the data from this assessment of three months, we developed the intervention protocol and set a list of activities that were potentially effective and required to achieve the objectives. The mean duration of the focus groups was 75 minutes (range: 60-90 minutes). The mean number of participants in the focus groups was 10-15. All the focus groups were physically conducted at a suitable place in villages.

2.2.2. Management Information System data

An online management information system was established. Young married women (n=37,324) were tracked for selected indicators, including socio-demographic variables (age at enrollment in the study, age at marriage, education, religion, social class, and possession of below poverty line card) and attendance in group education sessions. Six outcomes obtained through the management information system were compared with the baseline data. These included a) status of the last delivery if it was done by a skilled birth attendant, b) if women had received postnatal care within 48 hours of delivery, c) if women had a national health insurance scheme card, d) if women had an account in a bank or in a post-office, e) if women possessed a MGNREGA scheme card, and e) if women or anyone in the family utilized the MGNREGA scheme. All the data collected on papers by the outreach workers during the intervention were entered regularly into the management information system. The intervention progress was monitored at three-time intervals (after the first 15 months, during the middle 12 months, and in the last eight months) using four indicators, including the percentage of women identified, women groups formed, peer educators trained, and women accessed by community health workers or midwives.

2.2.3. Post-intervention assessment

We conducted qualitative research at the end line to observe perceived changes in the awareness and utilization of maternal and child health services by women, economic independence in households and livelihood opportunities for women. Besides, data were collected for perceived changes on gender equity norms in the societies, functioning of VHSNCs, and peer educators' and health care provider's experiences and perception on the changes in the community. FGD and IDI were the primary data sources. A total of 12 FGD were conducted with women (n=4), peer educators (n=2), mothers-in-law (n=2), outreach workers (n=2), and community health workers (n=2) and 20 IDI with all the other stakeholders, including husbands of women (n=6), midwives (n=2), medical officers (n=2), and VHSNC members (n=4). In addition, 4 IDI were done with community health workers and 4 IDI with peer educators. The samples were distributed equally across both districts. We used semi-structured interview guides during the interviews.

2.3 Ethical considerations

Ethical approval for the study was obtained from the MAMTA Institutional Ethical Review Board. Verbal informed consent was obtained from all the participants. All the participants were ensured of the confidentiality of the information shared with the project staff and research teams.

2.4 Data management and analysis

Quantitative analysis

The prevalence of the variables was expressed as frequencies and percentages. Mean and standard deviations were calculated for normally distributed continuous variables and the medians were calculated for continuous variables with skewed distribution. IBM SPSS statistics for windows version 24.0 (IBM Corp., Armonk, N.Y., USA) was used to do the analysis.

Qualitative analysis

All the interviews at baseline and end line assessments were recorded, transcribed, and translated into English. A content analysis was carried out to identify the main patterns related to the responses, and coding was done both inductively and deductively. All transcripts were assessed by two researchers and refined into codes. Coded data were categorized with all the relevant coded extracts collated within identified themes. The themes generated were reviewed, refined and discussed among researchers for consensus validation. Discrepancies among the researchers in interpretation were resolved through discussion, which helped further develop the analysis. The theory of change framework was used to define the key themes of the end line assessment.

Results

The results have been divided into three sections: results from the rapid assessment survey at the baseline, the analysis of the data obtained from the management information system and end-line qualitative assessments.

3.1 Rapid assessment survey at baseline

A total of 476 young married women, 240 from Banda and 236 from Kaushambi, who were pregnant or had a child less than three years of age responded to the quantitative questionnaire. The mean age of the women was 27 years. Approximately 66% and 81% of the women were illiterate (could not read and write) in Banda and Kaushambi, respectively (Supplementary Table 1). Overall, the socio-economic and demographic characteristics of the women were poor. Less than 50% of the women were aware of anemia, maternity benefit schemes, postnatal care, safe places for abortion and the MGNREGA scheme (Supplementary Table 2). More than three-fourth of the women did not receive 3 or more antenatal check-ups in both districts. The institutional delivery rate was 78% and 64% in Banda and Kaushambi, respectively. Only 23% of women in Banda and 13% in Kaushambi were using any family planning

method at the time of the survey. Around 40-46% of women had bank accounts and less than one-third of the women were registered for the MGNREGA scheme. Only 13% of women in both districts had ever worked under the MGNREGA scheme.

Although both districts had poor socio-economic indicators, Kaushambi found to have a higher burden of poverty, illiteracy, and unemployment as compared to Banda. The qualitative analysis was broadly divided into three key themes, namely, awareness and utilization of maternal and child health services, support from family (husbands or mothers-in-law) and utilization of the MGNREGA scheme by women (Table 3). Some of the key issues highlighted during qualitative analysis were poor knowledge about the importance of antenatal check-ups, family planning methods, newborn and childcare, and dissatisfaction with the government health services, and limited access to the MGNREGA scheme among women.

3.2 Management Information System data

The socio-demographic characteristics of the intervention population tracked through the management information system is shown in Table 4. Most of the women in Banda (90%) and Kaushambi (85%) attended at least 60% of the education sessions. Around 39% of women in Banda and 35% of women in Kaushambi were registered under the MGNREGA scheme, and 94% and 80% of them had also worked in the MGNREGA scheme, respectively (Table 5). Compared to the baseline, all the six outcomes improved among women at the end of the intervention (management information system data) except for possession of a bank account in Kaushambi (Table 5).

Nearly 24% of women had opened accounts as well as were registered in the MGNREGA scheme (Table 6). The progress tracked through the management information system at three-time intervals (after the first 15 months, during the middle 12 months, and in the last eight months) has been shown in Supplementary Figure 1.

3.3. End line assessment

The complete analysis of the qualitative data collected at the end line is broadly divided into six themes.

1) Perceived changes in the awareness and utilization of maternal and child health services by women

Women during FGD informed that their awareness about maternal and child health increased post-intervention. Most of the women coming to their facilities for antenatal care knew about maternity benefit schemes. They knew about early newborn care practices, the importance of early and exclusive breastfeeding, and a minimum gap of three years between two pregnancies.

Midwives, community health workers and VHSNC members reported that the awareness of the women about health care services had increased. Mothers-in-law understood their responsibilities of supporting and caring for their daughters-in-law during pregnancy. They knew about the emergency helpline number for the ambulance, the importance of childhood immunization, and family planning.

Now, all of us go to the hospital for delivery. ASHA bahu comes and takes us to the hospital and cares for us. She calls the vehicle (ambulance), and then we go to the hospital. (A woman during FGD; community health worker is called ASHA in the community)

After the intervention, I could perceive the change in the nutritional practices of women. Women have become more caring for their children and maintain hygiene. (A VHSNC member during IDI)

Peer educators had counselled women on the importance of breastfeeding and maternal nutrition during pregnancy and lactation. Peer educators had accompanied these women to the facilities for further support on many issues such as family planning methods, adequate latching during breastfeeding, and resolving misconceptions regarding immunization. Peer educators perceived that the utilization of most of these services had increased post-intervention. One noticeable change highlighted in the interviews was that the demand for health services from the communities had increased.

Outreach workers and community health workers had faced challenges in mobilizing marginalized women to avail of health services. Some of the major challenges that prompted low utilization of health services among marginalized women included illiteracy, poverty, ignorance, lack of women empowerment, traditional beliefs or misconceptions, and long distances to the health facilities. The outreach worker and community health workers succeeded in mobilizing such women for the intervention through repeated meetings and counselling of their family members. There was a wide gap in the service utilization rates at the baseline study between women from non-marginalized and marginalized families. However, this gap had decreased between the two groups after the intervention as revealed in interviews with community health workers, midwives, and medical officers.

2) Perceived improvement in economic independence in the households and livelihood opportunities for women

Women who worked under the scheme felt financially strong and independent. The money earned after getting work under MGNREGA or saved from daily savings was deposited in the bank account by the women. These savings had helped women investing money at times of need, such as starting their work, in emergencies for the medical treatment of their family members, education of their children, etc. Being an earning member of the family, such women could voice their demands and take decisions for family and self.

After being associated with MAMTA, I was encouraged by family members and neighbors to go outside and work. I worked at a place where my neighbors were also working; both got the opportunity to work under MGNREGA. (A woman during FGD)

Women were engaged in jobs other than MGNREGA, such as small cottage industries like poultry, goat rearing, and grocery stores. Some women's groups opened stitching centers to give training to the girls on stitching and embroidery. Such women's groups had linked women to other schemes for women development. The money earned from the new job was spent on starting a small new business.

After being associated with MAMTA, I started a stitching center. I used to train other girls. Recently, I have another embroidery and stitching center. (A woman during FGD)

Outreach workers and VHSNC heads endorsed this improvement in social mobility and the financial status of women in the communities. An increased number of women and people were linked to the MGNREGA scheme, and they received work for a minimum of 50-100 days. VHSNC members informed that women were told that they could work under MGNREGA and earn 156 INR (3USD) for working eight hours a day. Women were also informed that they could borrow money at a low-interest rate from the group's bank account to start a new venture. Community health workers helped women to open accounts in banks for the transfer of the money received under the scheme and had encouraged these women for daily savings and keeping the money in piggy banks.

Peer educators extended their support to women during the 'Demand for Work (*Kaam Mango Abhiyan*) campaign', and helped them in opening bank accounts. In the 'Demand for Work' campaign, group meetings were called by the MGNREGA staff to give information about the scheme.

Other perceived changes

3) Perceived change in gender equity norms in the communities

Gender disparities regarding access to education, adequate nutrition, and mobility prevailed in the communities. Outreach workers had educated communities about the importance of girl's education, and a nutritious diet for women and girls through magic shows, plays, and community-based events such as '*Saas Bahu Sameelan*' (meetings with mothers-in-law and daughters-in-law on a common platform).

People did not like a girl child in our village. My husband asked my mother-in-law not to give me food because I delivered a baby girl in my previous pregnancy. However, the project has changed the mindset of people. MAMTA staff educated us about the benefits of a girl child and to continue their education and let them earn name and fame. People now don't consider the difference between a male and a female child. (A woman during FGD)

Community health workers perceived a positive change in the attitude of men towards their wives. Ration cards (subsidy cards) were issued in women's names. All the subsidies and incentives from maternity benefit schemes or MGNREGA were transferred into women's accounts. Community health workers did not find any reported case of female foeticide in the last six months from the date of the interview. The VHSNC head recalled a play organized by outreach workers based on female foeticide and preventing the killing of a girl child. Husbands received education on gender equality and the need to educate girls through magic shows.

I do agree that if girls are educated, they will know their rights. And now, emphasis should be laid on educating more and more girls. When girls are educated, they will get to know their rights. Hence, education is very important. I do agree that there should be no discrimination between girls and boys. The

MAMTA staff had explained to me that one should not go for the gender identity test of the fetus. Craving to have a boy, I have seen people giving birth to six girls. (A husband during IDI)

Because of the project, I have observed a change in the attitude of my husband. Earlier I was not allowed to go outside anywhere except for defecation. However, after my husband attended meetings taken by the MAMTA staff, I have noticed a change in his behavior. I could go and move around in my village, and my husband did not mind. I could talk to people easily, chit-chat with other ladies. So, I have got this kind of freedom. (A woman during FGD).

4) Perceived changes in the functioning of Village Health Sanitation Nutrition Committees (VHSNC)

The VHSNC members had reported that they were not clear about their role in VHSNC before and became aware of the processes after the intervention. They had started to participate actively in the meetings to facilitate the processes of government schemes. The meetings were conducted monthly and decided to judiciously use the fund (10,000 INR) to provide health-related facilities in the village. The fund account was operated and maintained jointly by the VHSNC head and midwife. In the past, lack of effective communication or coordination between VHSNC members and the midwife had resulted in the cancellation of the meetings, an issue which was resolved after the intervention. Issues most commonly raised during such meetings included hygiene in the villages, facilitating access to the MGNREGA scheme by the women and people from marginalized communities, and immunization of under-five-year-old children.

There is a committee controlled by the midwife and VHSNC members to give more facilities to mothers. We channelized funds for cleanliness and support to the poor families who could not bear the expenses related to the delivery of a woman. In some cases, money was collected through group charity. MAMTA staff always encouraged women for better health services. (A VHSNC head during IDI)

5) Peer educator's experiences from the project and perceptions towards changes in the community

Peer educators did home visits, built rapport with family members, and organized sessions with women in the communities. They demanded more training on issues such as national family health insurance scheme, and refresher training on the other issues. Sessions elaborating on women's reproductive health and rights, financial literacy, and postnatal care were difficult to discuss by peer educators. Peer educators reported that the training conducted by the outreach workers was useful and engaging because different infotainment materials were used such as posters, videos, role-plays, and songs for discussions on the topics.

As a result of prevailing notions and misconceptions, it was difficult to obtain consent from the families for engaging their women in different activities. However, the use of communication tools such as magic shows and demonstrations, interactive meetings with husbands or mothers-in-law, collective decision-making and feedback mechanisms were some of the key strategies that helped in mobilizing communities for greater engagement in activities and bringing change in women's health practices. An

increase in perceived self-respect, confidence, and improved access to government health schemes was noticed among peers. Peer educators helped VHSNC in monitoring services in the communities for improvement in their quality of work.

We had observed service delivery points like Anganwadi centers and sub-centers for health services by midwives to assess the availability of different materials. (Peer educators from FGD; Child development centers are called Anganwadi centers in villages)

6) Health service providers' experiences from the project and perception about changes in communities

Community health workers and midwives in their interviews affirmed about the high quality of the training and workshops.

Very good training was given by project staff using different techniques like magic shows, dhol (drums), and TV shows. (A community health worker during IDI)

The training was good. Information about all the government schemes was provided. They answered our queries and explained things through poster or TV (shows). (A midwife during IDI).

Community health workers reported increased access to maternal health services by women. However, the consumption of iron-folic acid tablets and child immunization were perceived to be poor. Midwives opined that despite hard-core interventions (sessions and meetings), the uptake of family planning and postnatal care services by the women were poor in the communities. There was a scope of improvement in the intervention including advocating for the availability of adequate resources in the health centers such as a stethoscope, weighing machine, regular supply of iron-folic acid tablets, and vitamin A capsules, etc.

Two key issues highlighted by medical officers as needed to uplift the health situation of marginalized women were adequate nutrition and education (schooling). A change was noticed in the functioning of community health workers, including need-based planning, timely planning for services, and an inclusive approach to prioritize the health needs of marginalized women.

The key issues of women from marginalized families included poverty, migration, and pressure on females to earn a livelihood, lack of education, ignorance, social outcasts, poor transport facilities, more belief in quacks or traditional healers than registered practitioners. superstitions, etc. (A medical officer during IDI)

Discussion

This study used a pre-post research design to evaluate a community-based intervention on improving awareness and utilization of maternal and child health services, and access to livelihood and savings by women.

4.1 Improvement in health and economic outcomes

The peer-led intervention was able to increase awareness of the women about maternal and child health services. Other studies with similar intervention design have been effective in improving the health awareness of women.^{29,30} There was a perceived change in the utilization of most of the maternal and child health services by women except for the consumption of iron-folic acid tablets and uptake of contraceptives. Low consumption of iron-folic tablets among women, despite being visited by health workers has been reported in other studies.^{28,29} Plausible explanations for this were forgetfulness (non-compliance), perceived side effects of tablets among women and low stocks of the tablets at health facilities.^{31,32} Contraceptive decision-making, to a great extent, is influenced by women's financial autonomy and social status, socio-economic status of the family, and cultural and religious beliefs. Furthermore, early marriage, fear of side effects, partner's low education, and lack of adequate supply and friendly attitude of health workers contribute to the low uptake of family planning services by women.³³ Our intervention has not been able to address all these determinants at par. Further evidence-based interventions are warranted that target these determinants holistically and focus on men and women both to increase the uptake of family planning services.

There has been a change in the attitude of family members, including husbands and mothers-in-law towards maternal health, which influenced the utilization rate of health services among women. A recently published systematic review assessing the effectiveness of community-based intervention concluded that the support of influential family members like husbands and mothers-in-law is crucial for bringing change in the health practices of women.³⁴ The quantitative analysis reported an increase in the percentage of women receiving postnatal care services, which was in contradiction to what was told by midwives in the interviews. This can be explained from the fact that we measured postnatal care uptake within 48 hours of delivery whereas midwives' view might be based on the completion of seven postnatal care visits with every woman. Adherence to postnatal care regimen is poor among women and has not been achieved in many similar interventions. Studies highlighted the need for engaging men, educate women and deliver home-based care for enhancing post-natal care.^{35,36}

The uptake of jobs in MGNREGA or through other means increased post-intervention among women. Prior research indicated that MGNREGA has been successful in improving women's empowerment, social, and financial inclusion, especially of the vulnerable groups.³⁷ However, there were several challenges with the implementation of MGNREGA and its access by vulnerable populations. Findings from other studies reported that in Uttar Pradesh, despite increased participation of marginalized communities (scheduled castes or tribes, 48%), the participation by women in MGNREGA was meager (20%), which calls for policies and interventions to address the issues of empowerment and skill-building for increasing women's participation.^{38,39} MGNREGA can be envisaged as a women's economic and social empowerment program.⁴⁰

Women had learned to save money and use it for emergencies or their health purposes, for example, for transportation to the hospital at the time of delivery. However, less than 50% of women had opened an account on an average from the two districts. This might be due to poor understanding of banking or savings among women or a lack of support from the husband or family to do so or limited availability or accessibility to banks in the rural areas. Neither the data regarding reasons for not having an account were obtained in the survey, nor were they asked during the interviews. This creates a gap in our understanding of the factors responsible for poor access to savings among women, which could be explored in future studies. A cross-sectional study from Rajasthan found that financial literacy, including behavior and attitude (savings, household budgeting, opening an account) of the women, especially from rural areas was poor. One of the major factors attributable to this poor financial literacy could be their reliance on other family members, especially on males for finance-related matters, which could be another reason for their non-involvement in investment decisions.⁴¹ Financial literacy programs for women can be viewed as an effective approach to addressing education and financial needs.

The interventions had been successful in transforming the functioning of VHSNC and made the members of committees more responsible and knowledgeable about their responsibilities. Previous studies have highlighted gaps in the effective functioning of VHSNC and the need for building the capacity of their officials and improving their maturity.⁴²⁻⁴⁴ Some of the additional benefits of the intervention included a change in gender equity norms in the communities wherein men realized the importance of a girl child and the harmful consequences of female foeticide. Women got a space in familial discussions and respect from their husbands. While comparing some of the indicators between the two districts, it was realized that the improvement in Kaushambi was lesser than in Banda. Some of the factors which might be attributed to lesser performance could be higher poverty, illiteracy, and unemployment in Kaushambi than Banda (as highlighted in the baseline study).

4.2 Intervention strategies

The engagement with communities during the rapid assessment, health education events, including peer sessions, community-based events, and the VHSNC meetings, proved beneficial in increasing the uptake of services by the marginalized people. Based on the community engagement model, our intervention targeted to strengthen VHSNC for ensuring the equal participation of people and better governance of health services at the village-level. Sufficient evidence is available to support our intervention stating that community engagement has a positive impact on a range of health and social outcomes, across various conditions.²¹ The use of various community engagement methods and techniques proved beneficial in bringing the transformation and increasing people's participation in this intervention such as the use of magic shows, TV videos, etc. Most of the women recalled these events during the interviews. In the community engagement paradigm, it is indeed crucial to develop and adapt engagement tools based on the community context.⁴⁵ Peer educators were well received by the communities, and their intervention was successful in bringing change in the behavior of women. Participatory behavior communication with

peers on maternal and child health is an effective and sustainable approach, especially for the marginalized population.⁴⁶

Limitations and strengths

Although the findings bring to light the effects of the peer-led intervention, the results may be interpreted in view of certain limitations. The pre-post research design cannot ascertain the efficacy of the intervention, and in the absence of a control group, its generalization and validity are limited. The project was limited to two districts of Uttar Pradesh, which were different from many other geographies. Both districts have a large population of marginalized people and limited availability of health services. The cultural and religious beliefs are deeply rooted and extreme poverty is common to both districts. The end line evaluation was done using qualitative methodology, thereby limiting the quantifiable measurement of change in the health and economic status of women.

The community-based implementation across a large sample of women (n=37,324) was its strength and was better than many randomized trials not reflective of true field settings. Randomized trials are often limited by a lack of external validity, explicit mechanisms of change, and feasibility and acceptability of the experimental design.⁴⁷ Most of the field staff were women and from the same field settings, which helped in smoothly executing the intervention. The use of standardized tools leveraged easy adaptability and usage in the community.

Conclusions

This intervention demonstrates that peer-led approach may be used to improve the combined health and economic outcomes of marginalized women. Given the large number of social and structural determinants that affect health, targeting health factors alone may not be effective. Access to livelihood and savings are critical to women empowerment and utilization of health services. Furthermore, simultaneous engagement of husbands, mothers-in-law, health workers and village health committees in the intervention is a promising sustainable strategy for health improvement in women. The government of India's flagship scheme, MGNREGA, is a novel step to ensuring livelihood security to the marginalized population, the effective reach and successful implementation of which is still underachieved. The results provide optimism for improvement in the outcomes that did not change in the intervention, such as the iron-folic acid consumption, family planning uptake, and access to banking, provided actions are done with more rigor and intensity.

List Of Abbreviations

MMR: Maternal Mortality Ratio

MGNREGA: Mahatma Gandhi National Rural Employment Guarantee Act

SDG: Sustainable Development Goal

Declarations

Ethics approval and consent to participate

The study protocol was approved by the MAMTA Ethical Review Board (MERB). The MERB looks after the study protocols submitted by MAMTA Health Institute for Mother and Child. Verbal informed consent was obtained from all participants for the use of their data for research. For the consent of women and men less than 16 years of age, verbal informed consent from their parents, adult spouses, or caretakers was obtained. However, we did not obtain written consent from any participant during the intervention.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed in the present study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

SM and FA conceived and designed the study. FA and team collected the data. SS analyzed the data. SS and DM drafted the manuscript. SM and FA reviewed/consulted the manuscript; SS contributed to the critical revision of the manuscript. All authors commented on drafts and read and approved the final manuscript.

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Tables

Table 1. Sequential flow of the implementation activities

Phases of Implementation	Implementation activities
Pre-intervention	<ol style="list-style-type: none"> 1. Rapid baseline assessment 2. Mobilization of marginalized women from the communities and formation of groups by outreach workers 3. Identification of peer educators from within the groups and training of peer educators by outreach workers
Intervention	<ol style="list-style-type: none"> 1. Education sessions on maternal and childcare and financial literacy by peer educators 2. Community-based events and meetings to engage community leaders, husbands, and mothers-in-law of young married women 3. Active participation in the village health, sanitation, and nutrition committees' meetings 4. Capacity building of community health workers and midwives on segmentation and inclusive approach for delivering services related to sexual and reproductive health 5. Linking marginalized women with MGNREGA schemes, and running a campaign of 'kaam mango abhiyan' (Work demand campaign).
Post-intervention	End line assessment

Abbreviations: MGNREGA: Mahatma Gandhi National Rural Employment Guarantee Act

Table 2. Implementation actors and their roles

Implementation actors	Roles
State Manager and District coordinators	Effective liaising with government, and other relevant stakeholders, monitoring the activities, reviewing the progress of the intervention and managing the challenges and risks at the local level
Outreach workers	Conducting the training and providing mentoring support to the peer educators, handholding support and liaising with community health workers, VHSNC members, monitoring the activities of peer educators
Peer educators	Conducting education sessions for peers in the communities, handling problems, and providing solutions to their problems

Abbreviations: VHSNC: Village health, sanitation, and nutrition committee

Table 3. Qualitative data analysis from the rapid assessment at baseline

Themes	Responses obtained from the interviewees
<p>Awareness and utilization of MCH services by women</p>	<p>a.From the interviews with women Women had little information on newborn and child care practices, including breastfeeding, and newborn hygiene. The utilization of antenatal services was poor. Most of the women were dependent on mothers-in-law for any health-related problem of their children. <i>We visit doctors only in case of acute illness and not routinely for an antenatal check-up during pregnancy.</i> <i>We are poor and illiterate women who do not know about medical check-ups during pregnancy. I have not been told or asked by anyone to go to the doctor for a check-up.</i> (Women during FGD) <i>There is an exploitation of poor people at the PHCs. The medicines prescribed need to be purchased from private medical stores. If there are good medicines at PHC, we will surely buy from there for our treatment.</i> (Women during FGD) <i>My child suffered from pneumonia, and I took him to the government hospital, but there was no relief. Then, I took my child to a private hospital where my child fully recovered.</i> (Women during FGD) A few women knew about family planning methods. However, the uptake of contraceptives was poor because women were hesitant to talk about them, they have limited knowledge about them, a lot of misconceptions about their side effects prevail in the society, women lacked negotiation skills, non-cooperating attitude of husbands, and unavailability of contraceptives at health facilities.</p> <p>b.From the interviews with healthcare providers Medical officers revealed that the institutional delivery rate has improved in their areas, which might be due to the launch of the maternity benefit scheme (Janani Suraksha Yojna; JSY). Community health workers informed that women preferred to deliver in a district-level hospital instead of a PHC because of a lack of adequate facilities and pediatricians for the care of the newborn in primary health centers. <i>JSY has a big role in promoting institutional delivery at government service centers.</i> (A medical officer during IDI)</p>
<p>Support from family (husbands or mothers-in-law) for accessing MCH services</p>	<p>Women in some of the FGD reported a lack of support from husbands for institutional delivery or to work outside their homes. <i>Husbands denied permission for delivery at PHC and did not want money given under the JSY scheme.</i> (Women during FGD; JSY is maternity benefit scheme) <i>Men in the community wanted delivery to happen at home. They went to doctors only if their wives developed some problems after delivery.</i> (Women during FGD) <i>Our society is a male-dominated society. In some cases, it's a male's ego, which does not allow men to let their wives work outside their home and earn some money.</i> (Women during FGD)</p>
<p>Utilization of the MGNREGA scheme by women</p>	<p>A fewer number of women went to work under MGNREGA. Many women who started working under MGNREGA left it once they became pregnant. The MGNREGA staff mentioned that various services were provided to pregnant women at the worksites such as drinking water and medicines, a shed to feed their children. However, most of the women did not continue for a very long time. <i>Yes, the women may feel difficult to work at MGNREGA sites because of their pregnancy or because they had delivered a baby. Repeated</i></p>

childbirths deprive them of good health and stamina, and the mothers are not able to produce output at the work sites. (A MGNREGA staff)

Abbreviations: FGD: Focus group discussion; IDI: In-depth interviews; JSY: Janani Suraksha Yojna; MGNREGA: Mahatma Gandhi National Rural Employment Guarantee Act; MCH: Maternal and child health, PHC: Primary health centers

Table 4. District-wise distribution of the socio-demographic status of women (n=37,324) obtained through the management information system

Socio-demographic variables	Banda (n=18,871) N (%)	Kaushambi (n= 18,453) N (%)
Mean (SD) age of the women (years)*	28 (8.4)	28 (9.2)
Mean (SD) age at marriage (years)¶	17.3 (1.4)	14 (7.3)
Mean (SD) years of schooling (years)†	4 (3.0)	10 (1.5)
Religion		
Hindu	17845 (94.6)	17010 (92.2)
Muslim	1018 (5.4)	1432 (7.8)
Christian	8 (<0.1)	2 (<0.1)
Missing cases	0	9 (<0.1)
Social class		
Scheduled castes	7084 (37.5)	16463 (89.5)
Scheduled tribes	1139 (6.0)	94 (0.5)
Other marginalized castes	10195 (54.0)	1446 (7.9)
Non-marginalized class	408 (2.2)	133 (0.7)
Missing cases	45 (<0.1)	317 (1.7)
Possession of below poverty line card		
Yes	12341 (65.4)	7766 (42.3)
No	6530 (34.6)	10608 (57.7)
Missing cases	0	79 (<0.1)

Abbreviations: SD: Standard Deviation

**The denominator for Banda was 14984 and Kaushambi was 16655.*

¶The denominator for Banda was 18869 and Kaushambi was 18447. The data were skewed. The median years of schooling for Banda were 0.

†The denominator for Banda was 18861 and Kaushambi was 18453

Table 5. Frequency and percentage distribution of the outcome indicators comparing data from baseline and Management information system

Variables	Baseline		MIS Data	
	Banda (n=240) N(%)	Kaushambi (n=236) N(%)	Banda (n=18,871) N(%)	Kaushambi (n=18,453) N(%)
Women who had an account in her name in bank or post-office	93 (38.8)	108 (45.8)	10316 (54.7)	8238 (44.6)
Women or her family registered to work in MGNREGA	73 (30.4)	67 (28.4)	7353 (39.0)	6591 (35.7)
Of those registered to work, women who utilized MGNREGA scheme [¶]	31 (42.4)	32 (47.7)	6922 (94.1)	5234 (79.4)
Women who delivered in an institution*	189 (79.1)	162 (68.6)	794 (97.7)	95 (87.2)
Women who received postnatal care within 48 hours of delivery†	31 (12.9)	26 (11)	749 (78.0)	85 (78.0)

Abbreviations: MGNREGA: Mahatma Gandhi National Rural Employment Guarantee Act; MIS: Management Information System

[¶]Total sample size for MIS data for Banda (n=7353) and Kaushambi (n=6591)

*Total Sample size for MIS data was: Banda (n=847) and Kaushambi (n=109)

†Total sample size for MIS data was: Banda (n=1629) and Kaushambi (n=1372)

Table 6. Frequency and percentage distribution of women who had accessed/not accessed MGNREGA and/or had a bank account and/or received education sessions based on MIS data

Variables	Total (n=37,324) N(%)
Women who registered in MGNREGA and had a savings bank account	8932 (23.9)
Women who registered in MGNREGA but did not have a savings bank account	5012 (13.4)
Women who had a savings bank account but did not register in MGNREGA	9622 (25.8)
Women who did not register in MGNREGA and did not have a savings bank account, but have received group education sessions and taken any other health benefits	13758 (36.8)

Abbreviations: MGNREGA: Mahatma Gandhi National Rural Employment Guarantee Act; MIS: Management Information System

Supplementary Tables

Supplementary Table 1. District-wise distribution of the socio-demographic characteristics of the women (n=476) at the rapid assessment survey

Socio-demographic variables	Banda (n=240) N(%)	Kaushambi (n= 236) N(%)
Age groups (years)		
15-24	82 (34.2)	56 (23.8)
25-35	140 (58.3)	165 (69.8)
>35	18 (7.5)	15 (6.4)
Mean age of the women (years)	27.6	27.6
Mean age at marriage (years)	17.2	17.3
Mean number of children per women	3	3
Religion		
Hindu	220 (91.3)	230 (97.5)
Muslim	20 (8.8)	6 (2.5)
Social class		
Scheduled castes	196 (81.7)	204 (86.4)
Scheduled tribes	9 (3.8)	12 (5.1)
Other marginalized castes	33 (13.8)	19 (8.1)
Non-marginalized class	2 (0.8)	1 (0.4)
Education status of the women		
Illiterate	157 (65.8)	191 (80.9)
Literate but never been to school	9 (4.2)	7 (2.5)
Literate (formal education)	74 (30.8)	38 (16.5)
Current employment status of the women		
Work in their own field	7 (2.9)	24 (10.2)
Work as wager in other's field	63 (26.1)	180 (76.6)
Employed under MGNREGA	11 (4.2)	0
Housewife	132 (55.0)	27 (11.1)
Others	27 (10.9)	5 (2.1)

Abbreviations: MGNREGA: Mahatma Gandhi National Rural Employment Guarantee Act

Supplementary Table 2. District-wise distribution of the prevalence of awareness and utilization of the maternal and child health services, and access to livelihood and savings by women (n=476) at baseline

Variables	Banda (n=240) N(%)	Kaushambi (n=236) N(%)
Awareness of maternal and child health care	Yes	Yes
Women who heard about early registration of pregnancy	179(74.6)	138(58.6)
Women who heard about anemia during pregnancy	49(20.4)	34(14.4)
Women who were aware of the maternity benefit scheme	85(35.4)	133(56.4)
Women who heard about postnatal care services	73(30.4)	48(20.3)
Women who heard about family planning methods	(19.2)	(13.6)
Awareness on home-based management of diarrhea		
Give oral rehydration solution	66(27.5)	42(17.8)
Salt and water	60(25.0)	105(44.5)
Normal food to continue	9(3.8)	3(1.3)
Continue breastfeeding	24(10.0)	8(3.4)
Sufficient fluids	30(12.5)	4(1.7)
Awareness about symptoms of pneumonia		
Difficulty in breathing	202(84.5)	(67.1)
Difficulty in eating	77(32.1)	(7.6)
Excessive yawning and difficulty in getting up	79(33.3)	(13.9)
Chest pain or cold	160(66.7)	(26.6)
Fast breathing	97(40.5)	(45.6)
Running nose	108(45.2)	(1.3)
Heard about child immunization	(81.7)	(68.2)
Women who know about safe places for abortion	(24.2)	(29.7)
Women who heard about the national health insurance scheme	(34.6)	(23.6)
Women who heard about the MGNREGA scheme	(42.1)	(46.1)
Utilization of maternal and child health services		
Women who received 3 and/or more antenatal check-ups	60(25)	46(19.7)
Women who received 2 tetanus toxoid injections during pregnancy	228(95)	199(84.3)
Women who received 100 iron-folic acid tablets	187(77.9)	158(66.9)
Women who had a urine test done during pregnancy	164(68.3)	43(18.2)
Women who had any blood test done during pregnancy	184(76.7)	75(31.8)
Women who saved money for the delivery	86(35.8)	122(51.7)
Women who had an institutional delivery	190(79.2)	164(69.6)
Women who received money from the maternity benefit scheme	203(84.7)	171(72.7)
Women who received two or more postnatal services from the health facility	108(45.1)	41(17.6)
Women who initiated breastfeeding within an hour of birth	(91.3)	(43.0)
Children who were fully immunized	(40.8)	(36.9)
Women who were currently using any family planning method	(23.0)	(13.0)
Women who ever had any abortion	(5.4)	(4.3)
Others		
Women who possessed a bank account	(38.8)	(45.8)
Women who possessed the national health insurance card	(15.0)	(6.0)
Women who were registered to work under the MGNREGA scheme	(30.4)	(28.4)

Abbreviation: MGNREGA: Mahatma Gandhi National Rural Employment Guarantee Act

The percentages may not add up to a total of 100% because the frequencies of only 'yes' responses have been shown.

Supplementary Figure Legend

Supplementary Figure 1. Progress tracking chart of the intervention activities across three intervals of the project (first 15 months, middle 12 months and last eight months)

*All figures are in percentage

Figures

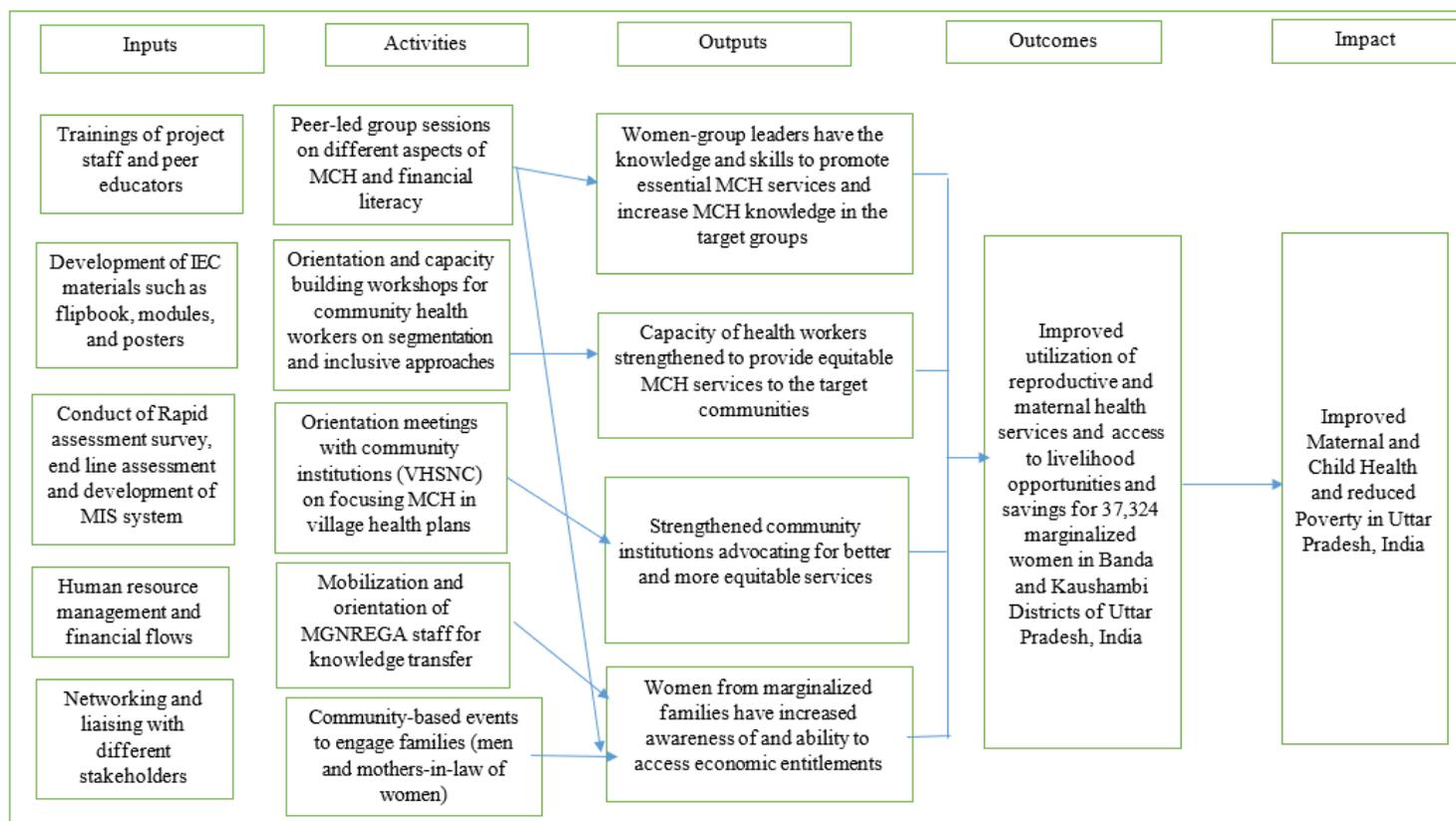


Figure 1

Theory of change for the community-based intervention across two districts of India Abbreviations: IEC: Information, education, and communication, MIS: Management information system; MCH: Maternal and child health; MGNREGA: Mahatma Gandhi National Rural Employment Guarantee Act; MCH: Maternal and child health; VHSNC: Village health, sanitation, and nutrition committee

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SupplementaryFigure1.jpg](#)