

# Maternal and Neonatal Health Knowledge, Service Quality and Utilization: Findings from a Community Based Quasi-experimental Trial in Arghakhanchi District of Nepal

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## ABSTRACT

**Background:** As part of the Partnership for Maternal and Newborn Health Project (PMNH), HealthRight International collaborated with Mother and Infant Research Activities (MIRA) to conduct operations research in Arghakhanchi district of Nepal to explore the intervention impact of strengthening health facility, improving community facility linkages along with Community Based Newborn Care Program (CB-NCP) on Maternal Neonatal Care (MNC) service quality, utilization, knowledge and care seeking behavior.

**Methods:** This was a quasi-experimental study. Siddahara, Pokharathok, Subarnakhal, Narpani Health Posts (HPs) and Thada Primary Health Care Center (PHCC) in Electoral Constituency-2 were selected as intervention sites and Arghatosh, Argha, Khana, Hansapur HPs and Balkot PHCC in Electoral Constituency-1 were chosen as controls. The intervention started in February 2011 and was evaluated in August 2013. To compare MNC knowledge and practice in the community, mothers of children aged 0-23 months were selected from the corresponding Village Development Committees (VDCs) by a two stage cluster sampling design during both baseline (July 2010) and endline (August, 2013) assessments.

The difference in difference analysis was used to understand the intervention impact.

**Results:** Local resource mobilization for MNC, knowledge about MNC and service utilization increased in intervention sites. Though there were improvements, many effects were not significant.

**Conclusions:** Extensive trainings followed by reviews and quality monitoring visits increased the knowledge, improved skills and fostered motivation of health facility workers for better MNC service delivery. MNC indicators showed an upsurge in numbers due to the synergistic effects of many interventions.

**Keywords:** CB-NCP, facility strengthening, HFOMC, MNC QI, PMNH, Nepal

## INTRODUCTION

The factors contributing to high maternal and neonatal mortality in Nepal are low utilization of facility-based services for maternal and neonatal (MNH) health problems, low utilization

of postpartum and neonatal care services, lack of provider's knowledge and skills, insufficient health facility capacity, and lack of knowledge about MNC in the community. Segregated community and facility focused interventions,

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policies and programs that address maternal and newborn care separately helps compounding the problems.<sup>1</sup>

Community Based Newborn Care Program (CB-NCP) was endorsed by the Ministry of Health and Population (MoHP) in December 2007. CB-NCP package requires a functioning health system to provide effective MNC service delivery, hence indicating the need to strengthen the health facilities and build linkages with them.<sup>2,3</sup>

In Arghakhanchi district, as part of the Partnership for Maternal and Newborn Health (PMNH) Project, HealthRight collaborated with Mother and Infant Research Activities (MIRA) with the aim to increase and sustain utilization and quality of community and facility based maternal and newborn care (MNC) services.

This study compares knowledge, skills, and motivation of health workers in providing MNC care, explore availability of MNC equipment, drugs and supplies, service utilization rates, and MNC knowledge and practices among the community in the intervention and control areas.

## METHODS

The study design was quasi-experimental. Random allocation of intervention package was not applied. The intervention and control sites were purposively selected. Arghakhanchi has two electoral constituencies (EC). Siddhara, Pokharathok, Subarnakhal, Narapani health posts (HP) and Thada Primary Health Care Center (PHCC) in EC 2 were selected as intervention sites based on the poorer MNC status evidenced by the baseline study (PMNH July 2010). All the relevant information from intervention and control sites were recorded during baseline study and compared with the endline. All intervention components were implemented in selected sites: the five health facilities and the corresponding village development committees (VDCs). In addition to five health facilities in intervention sites, MNC QI was implemented in the district hospital, as well as at the Khilji sub health post (SHP) and Pali SHP, which were providing 24 hour delivery services and maternal and perinatal verbal autopsy and near

miss review was implemented in district hospital. As to the level of health facility and services provided, this study had set different criteria for main focused interventions.

Five health facilities selected in EC 1 Arghatosh, Argha, Khana, Hansapur HPs, Balkot PHCC, and respective VDCs served as control sites.

Training packages on CB-NCP along with distribution of misoprostol tablet and Chlorhexidine ointment were provided across the district. The interventions were implemented in intervention sites from February 2011 to March 2013, which comprised of: maternal and newborn care quality improvement (MNC QI) process; supply of essential MNC equipment; health facility management and strengthening program (HFMSPP); maternal and neonatal near miss/death reviews process.

The HFMSPP focused on capacity development of health facility operation and management committees (HFOMCs) and the approach included self-assessments as evidence of such improvement. The self-assessments comprised of three elements; institutional capacity and committee empowerment; health facility management; and health service status. Each element was evaluated and scored from 1 to 17. HFOMCs who achieved a score between 13-17 were considered good; between 8-12 were fair; and below 8 were considered poor. Besides these, the capacity in terms of enthusiasm to seek additional financial support for the health facility was also explored.

The National Health Training Center under Nepal Department of Health Service developed twelve MNC QI tools, out of which this study used nine tools which focus on improving MNC service delivery. The details of nine tools used in this study are given in Table 1. The MNC QI forms comprised of selected nine tools were given to health workers and Auxiliary Nurse Midwives present at selected health facilities. While one peer was performing the duties, the other peer observed him/her and filled up the MNC QI.

Maternal and newborn near miss (cases who nearly died but survives with appropriate treatment) and death review process focused to record near miss cases and ascertain causes of maternal and peri-

natal deaths in the community by interviewing the close relatives and caregiver/ mother. This study trained the health facility staff to document these events occurred in health facilities and community of EC-2.

The project supported each health facility in intervention sites with phototherapy, warm cot, resuscitaire, foot/electric suction, Bag and Masks, emergency lights, and weighing machines.

Apart from the health facilities, this study used mothers of children of 0-23 months as the sampling unit. In both baseline and endline surveys, the mothers of children 0-23 months were selected by a two-stage cluster sampling design in which 30 clusters were selected in the first stage by using the Probability Proportion to Size (PPS) method. In this study, a ward was considered a cluster which is an extension of a VDC. Eligible households were selected by simple random sampling method. In intervention sites, 140 mothers of children 0-23 months were enrolled in the study in both baseline and endline surveys. In control sites, 180 mothers in baseline and 200 mothers in endline survey were selected. The selected participants were interviewed using semi structured questionnaire. As this OR study is the part of the PMNH project, the sampling design followed in the main baseline and endline studies were adopted.

Data from Health Management Information System (HMIS) March 2010 to March 2013 was used for comparing service utilization. All other comparisons were made based on primary data.

The data was entered in SPSS 17. The data were analyzed using percentages. Difference in difference (DID) analysis was used to estimate the impact of the intervention over the project period. The level of significance was set at 5%.

## RESULTS

This study explored the additional financial support obtained by the health facility as one of the aspect to measure the capacity of the HFOMC members. The financial share in intervention area increased significantly. The average difference in locally mobilized fund amount was NRs. 161,680 (approx. USD 1616.80) between intervention and control

sites. HFOMC individual dimensions scores were initially lower in intervention sites as compared to control sites but by the endline, the scores were better in intervention sites (Table no. 1).

**Table 1. Impact of HFOSP and MNC QI process implementation.**

Attributes	Intervention		Control		D I D estimate
	Baseline	Endline	Baseline	Endline	
<b>Milestones of capacity building of HFOMC</b>					
Average explored fund (in Rs.'000) from outer sources	98,520	227,200	79,600	46,600	161,680*
Average institutional capacity score	4	13.2	8	6.8	10.4*
Average health facility management score	7	14.6	10.2	7.2	10.6*
Average health service score	6.6	15	10.2	9.6	9*
Total number of staffs hired by HFOMC	0	11	0	3	
Total number of meetings held in a year	10	46	13	16	
<b>Average score (%) of MNC QI</b>					
Tool 1, Infection prevention	19.8	89.6	16.7	50.0	36.5*
Tool 2, Focused antenatal care	32.8	90.7	28.3	53.3	32.9*
Tool 3, Complications during pregnancy	30.0	87.5	33.3	27.8	63.1*
Tool 4, Normal delivery and immediate newborn care	30.0	81.0	34.7	46.0	39.7*
Tool 5, Postpartum care	36.7	86.7	22.2	60.0	12.2
Tool 6, Newborn care	20.5	93.2	33.3	81.8	24.2
Tool 7, Complications during labor and childbirth	24.1	88.0	49.1	63.0	50.0*
Tool 8, Assessment of a newborn with a problem	17.5	90.0	40.0	73.3	39.2*
Tool 9, Family planning	33.3	94.2	23.3	71.7	12.5

\*significant at 5% level

Intervention area HFOMCs managed to increase the number of meetings and more number of staffs in health facilities than control area HFOMCs. There were 7 DHO supported staffs in both the areas (Table no. 1).

The intervention sites HFOMCs were able to produce an annual plan and proposed 52 specific activities, out of which they completed 36 (69%)

within the study period. They also prepared a three year work plan, proposed 75 strategies of which 57 (76%) were implemented within two years. The HFOMCs in intervention sites were able to enhance the services and build community facility linkages.

Aggregated scores in intervention sites exceeded the 80% target across all MNC-QI tools by endline. Overall scores in the control sites did not attain the target score of 80% except for Tool 6: newborn care. Intervention sites did well on all nine tools with marked increase in average scores on Tool 1, Tool 2, Tool 3, Tool 4, Tool 7, and Tool 8 (Table no. 1). The interventions proved useful in MNH service delivery as indicated by higher scores in the intervention sites.

Forty one facility based perinatal, 45 community-based perinatal and neonatal, 2 community-based maternal verbal autopsies; 31 obstetric and 28 neonatal near miss cases were documented in intervention sites.

The intervention sites observed an inclined trend of service utilization. Number of women attending at least four ANC visits increased from 269 at baseline to 357 (32.7% increase) by endline. Similarly, health facility delivery increased from 103 at baseline to 239 (132% increase) by endline. In control sites, number of women who have four ANC visits decreased from 354 at baseline to 352 (0.6% decrease) at endline. Health facility delivery was 156 at baseline and increased to 191 (22.4% increase) at endline (Table no. 2)

**Table 2. Service utilization at health facilities over the study duration.**

Attributes	Intervention		Control	
	Baseline	Endline	Baseline	Endline
Number of women attending at least four ANC visits	269	357	354	352
Number of deliveries	103	239	156	191

The number of health facilities with 24 hour MNC service delivery in intervention and control sites increased except for ANC services in the control sites. By the end of the study, all the health facilities in intervention sites had 24 hour services in ANC, delivery, PNC and manual removal of placenta.

Most of the equipment provided as the project support to health facilities of intervention area were used for better neonatal care service delivery. Approximately 1500 cases used resuscitaires, 150 cases used warm cots and 46 cases used Bag and Masks.

Health facilities in the intervention area managed to keep the equipment in functional condition. Though, the number of facilities with maintained equipment decreased in the control sites, weighing machines, ambu bags, and resuscitaires were maintained and kept in good condition.

**Table 3. Intervention impact on MNC knowledge and practice in the community.**

MNC knowledge and practice (Average percentage)	Intervention		Control		D I D estimate
	Baseline (n=140)	Endline (n=140)	Baseline (n=180)	Endline (n=200)	
Mothers who knows at least 2 pregnancy danger signs	69.5	83.5	83.5	84.0	13.5
Mothers who knows at least 2 neonatal danger signs	80.5	82.0	84.3	92.8	-7.0
Mothers with ANC assisted by SBA	68.5	86.0	71.3	72.4	16.4
Mothers visiting at least four ANC	62.0	71.1	55.7	72.5	-7.7
Mothers with health facility delivery	27.5	50.6	24.3	57.0	-9.6
Mothers with delivery assisted by SBA	28.5	52.6	25.3	44.0	5.4
Newborn wiped and dried immediately after birth	72.8	82.0	68.9	66.3	11.8
Newborn wrapped with dry cloth	77.4	88.6	80.4	81.3	10.3
Newborn fed with colostrum	91.0	90.1	97.0	94.7	1.5
Newborn breastfed within one hour	32.6	55.5	33.7	45.9	10.8

The household survey revealed that the percentage of respondents in each of the indicators were on average higher in intervention sites as compared to control sites except for respondents with knowledge of at least two neonatal danger signs, respondents who received at least four ANC visits and delivered at health facility. An almost equal

percentage of children were fed colostrum in both the intervention and control sites. None of the indicators were statistically significant in the analysis (Table no. 3).

## DISCUSSION

The interventions integrated components of quality of care, community mobilization, and system strengthening into one. The third national review on safe motherhood and newborn health programs held in 2008 in Nepal, highlighted the need for strengthening facilities along with community-based interventions realizing that the CB-NCP training package required a functioning health system to provide effective MNC service delivery. Recent reviews of community-based newborn care packages found that availability of referral services and strong supervisory systems were crucial to the interventions' success and would be a necessary feature for scaling up.<sup>2</sup> A sustainable approach is required to reduce mother and newborn mortality,<sup>4</sup> and strengthening of the health system is required for delivery of effective maternal and newborn care services.<sup>5,6</sup> The project ensured sustainability by training the representatives from the DHO, the District Development Committee and Women Development Organization as district trainers so that the HFMSp program could receive continuous support. After the completion of the study, the DHO scaled up HFOMC training in other four health facilities of Arghakhanchi through UNFPA support.

One of the causes of high maternal and perinatal deaths in developing countries is the absence of or poor linkages between health facilities and the communities they serve.<sup>7</sup> Community-based packages supplemented by developing and strengthening linkages with local health facilities is needed for reducing maternal and newborn morbidities.<sup>3</sup>

The OR focused on trainings to help committee members internalizing their responsibilities, enhanced their knowledge and management skills, increased their sense of belonging within the health facilities, hence they were able to build stronger community and health facility linkages. The ability to raise additional financial resources was a major accomplishment of HFOMCs in intervention sites.

The HFOMCs in intervention sites managed to raise funds from sources such as VDC council. HFOMCs regularly held meetings to discuss the targets of MNC service delivery. HFOMC in Siddhara HP was able to form community facility linkages by mobilizing the forest users committee and locals to build the static clinic building. Siddhara, Narpani, Subarnakhal HPs and Thada PHCC revitalized PHC-ORC services. Narpani HP set an example of community facility linkages by buying about 5476 sq. ft. of land to run a birthing center, with complete financial support from the community. Pokharathok, Subarnakhal and Siddhara HPs started emergency reproductive health funds. Some health facilities managed stretchers for effective referral systems. HFOMC members developed sense of belonging, they became involved in monitoring equipment use, and acquired more equipment such as solar sets, medicines and furniture. Thada PHCC and Siddhara HP started 24 hour delivery services immediately after the training. For better operations, these health facilities managed to hire required staff on their own initiatives, closely supervised the service delivery and were able to identify the gaps and rectify them. For better ANC services, the HFOMCs managed required beds and curtains within the health facilities to maintain patient privacy. HFOMCs in control sites were not as effective as in intervention sites to actively engage their members for regular meetings, hiring new staff and fund raising. All these factors contributed for higher individual dimension scores in intervention sites.

Positive changes were observed in another study which strengthened the HFOMCs but the results were not sustainable as capacity building was equated with training and emphasis was not on monitoring and periodic review. Further, they discussed that training was more knowledge based rather than skills mixed. Moreover, they suggested that the capacity building of HFOMC should be understood as a process of strengthening a peripheral community health system and be implemented in a complete package.<sup>8</sup> The present study implemented its interventions in a complete mix of a training, skill development and motivation of health facility workers in a form of programs like HFMSp, MNC QI process, maternal and neonatal death review and near miss and health facility

support.

MNC QI process was able to create change by motivating the health facility staff. Thada PHCC initiated distribution of clothes to newborn babies delivered at the facility, with a 50% cost sharing between HFOMC and the family. Pokharathok HP started free distribution of warm wrapper for the newborn. Khilji sub health post announced plans to make their VDCs home delivery free. Extensive trainings increased the knowledge, skills and motivation of health workers and therefore delivered better MNC services. The capacity building programs and maintenance of essential newborn care equipment enabled the health facilities to successfully manage their cases. The study showed inconsistency in the performance standards of health facilities in which none of the MCC QI tools were used. This study provided a learning experience and success of MNC QI process implementation at peripheral health facilities.

The baseline and endline survey of the intervention sites showed increase in trend of nearly all of the indicators. However, negative DID estimates were observed for some of the indicators pointing to poor situation in intervention sites. It is important to reemphasize that the intervention sites were in substandard conditions as compared to control area before the initiation of the project. Although change has been documented, the control sites have also improved and marked differences might not have been obvious because one of the component CB-NCP was common in both sites. Inclined trends explains that interventions improved the status and services of health facilities, enhanced the capacity of health staff and motivated them for change.

## CONCLUSIONS

Along with all capacity building programs, support of essential newborn care equipment enabled the health facilities of intervention area to cater better MNC services. Intervention package proved its effect as per the variations seen in scores on HFOMC capacity and committee empowerment, facility management and service status, MNC QI

standards. Any change achieved is the outcome of the synergistic effects of many programs such as HFOMC, MNCQI process, maternal and newborn near-miss and death review and health facility strengthening.

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