

Maternal Health Status in Tribal India: A 5-Year Intervention Program and its Outcome

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Abstract

Introduction: There is poor penetration of evidence-based maternal health care provided under national health programs in resource-poor underserved regions. A well-planned locally acceptable community-driven comprehensive health promotion strategy and quality health care delivery mechanism is necessary to improve the situation. **Objective:** The main objective was to find the gaps in the existing system and promote health literacy and health-seeking behavior. **Methodology:** 80,000 tribal population living in isolated conflict zone of Bastar district was covered for 5 years between 2012 and 2017. An integrated health-care plan was developed with community leaders, panchayat, and the local government to promote and provide quality evidence-based maternal health care. Available resources were mobilized and health technologies introduced. **Results:** Regular home visits, point of care diagnostics, identification of high-risk mothers and their timely referral, and behavioral change communication increased the trust of the community. It resulted in higher demand for evidence-based health interventions. The adolescent pregnancy rate (<19 years) reduced to 6.8% (2016) from 13.5% (2012). Hemoglobin level >9 g% (third trimester) improved. Supervised births and high-risk referrals increased from 19.5% (2014) to 58% (2017) and 8.5% (2014) to 13.1% (2017), respectively. Although significant improvement was noted, key indicators continued to remain below rural Bastar (National Family Health Survey-4). **Conclusion:** Promotion of existing good practices, behavior change, health technologies, and evidence-based emergency care improved the maternal health status of the secluded and underserved tribal community, but persistent effort is needed to enable women access the quality maternal health services provided under National Health Mission.

Keywords: Behavior change, health systems, information communication technology, maternal health, tribal women

INTRODUCTION

The maternal mortality rate (MMR) has declined in most countries across the world over the decades due to proactive global policy. However, 99% of maternal deaths still occur in developing countries. Sub-Saharan Africa (57%) and South Asia (30%) including India account for most of them. The risk of dying from a pregnancy-related cause during her lifetime is about 36 times higher in women residing in developing countries.^[1-5] India is actively strengthening its health-care delivery mechanism not only to provide minimum perinatal care but also to promote girl's education and nutrition in the resource-poor tribal hinterland and rural areas.^[6-8] Poor local participation in decision-making and low health literacy prevented effective implementation of the national health policies and delivery of evidenced-based quality health care to tribal communities living in isolated inaccessible forest, hills, and conflict zones. Thus, a 5-year active intervention

program (2012–2017) was launched in partnership with the local self-government and other key-government stakeholders to understand the existing gaps and suggest a suitable maternal health-care model for them. Specific emphasis was laid on behavior change communication (BCC) to promote good traditional practices, identify the danger signals, and advocate the benefits of evidence-based medical care. Collective activism, social marketing, and system strengthening were adopted as immediate strategy. Information communication technology (ICT) and point of care (PoC) diagnostics were introduced in addition to resource mobilization.^[9-11] Due to

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proactive government initiative and project strategy, the health indicators of the tribal community living in isolation improved, but more work needs to be done by all the stake holders, so that the facilities provided under National Health Mission (NHM) can be accessed and utilized by them.

METHODOLOGY

It was a community-based, exploratory, cross-sectional, contextually designed study to cover 80,000 tribal population of Bastar, Chhattisgarh, for 5 years from 2012 to 2017.

Ethical approval and consent to participate

Institutional and local panchayat approval was obtained as per the laws governing community work. The Ramakrishna Sarada Sevashram-Vivekananda Tribal Hospital's Institutional Ethics Review Committee provided ethical approval and periodically reviewed the progress of the work during its implementation. The target population lived in three different clusters comprising three different subcaste of tribes. All of them had similar practices concerning pregnancy and neonatal care. An ambulatory network of clinic cum health camps was set up at strategic locations with the help of the local panchayat to introduce three key strategies such as collective health activism, social marketing, and system strengthening for health promotion.

The study was conducted in three phases

In preintervention phase, mapping of hamlets (Pada) of villages in different clusters and preliminary survey was completed. Brainstorming sessions were conducted on their perceptions of maternal health. It generated knowledge regarding reproductive health, economic and livelihood activity, customs and social fabric, communication, transport, resources, road connectivity, and accessibility. Information Education Communication (IEC) materials were prepared and training programs launched to empower the community nominated village (hamlets) volunteers on survey methods, health-care protocols, advocacy and social mobilization techniques, and ethical issues. Contextual enquiry and persuasive method was utilized in addition to conventional group discussions, participatory rural appraisal, transect walk, brainstorming sessions, and house-to-house contacts for sensitization at village and hamlet (pada) level. During active intervention phase, health promotion activities were intensified by mobilizing and sensitizing the population on various preventive aspects of maternal and neonatal health practices. IEC materials and ICT tools were extensively used. The technical capacity of the local health workers was strengthened jointly with the local government. Additional health centers were established to cater to the population during rough weather, epidemics, and outbreaks. During passive postintervention phase, the intervention area was partially exited, but active follow-up once a month was continued, and the data were analyzed to check sustainability, periodic impact, and outcome. At downstream level, interpersonal communication was initiated to disseminate information on benefits of early intervention and

dangers signals to mothers, in-laws, husbands, daughters, and general public. At midstream level, the existing front line health workers were retrained to reduce system errors; at upstream level, people in power who manages operations at community health center. General hospital, maternity center, and district collector office were involved to strengthen the systems.

Statistical methods

Collected data were validated and entered in the Microsoft Excel worksheet to check for any possible error, and subsequently, statistical analysis was done using SPSS software, version 17.0. (Statistical Package for the Social Sciences Inc., Chicago, USA). Categorical data were expressed in percentages. Average mean and percentage analysis was applied for comparative analysis and for prediction of events postintervention.

RESULTS

Indigenous people mostly live in hills, deep forests in remote village, and hamlets scattered over a vast hinterland having their own rigid rules, cultural belief, and traditional practices. The analysis of 10,663 population (2000 household) validated data showed 50% males and 49.54% females (all age group). Fifty-one percent belonged to the reproductive age group (15–45 years). Five percent were elderly population (>60 years). Female: male ratio at birth was 1:0.933. Eighteen percent of the population were widows or widower, which was more than the national average of 8%–9%. Information access via electronic media and newspaper were 12% and 16.9%, respectively. Only 3% of the population used bicycle as personal conveyance, much lower than average rural Indian population.^[12] Borewell or hand pump were the main sources of drinking water. 90% of pregnant women travelled on foot 3–9 km/day to fetch water, a significant cause of energy expenditure. Ninety-eight percent of women used forest dry wood for cooking. Government is now replacing it with natural gas. Women living in remote-secluded locations continued to practice traditional way of life; live-in relationship (49.5%), engaged in agricultural activities (71%–80%), menial job under MGNREGA (19%) as compared to their counterparts living closer to block HQ; Live-in relationship (17.4%), engaged in agriculture (57%) and local Government (14.78%), home maker (27%). They also showed significant variation in their reproductive status [Table 1]. Postintervention impact (2012 to 2017): The literacy rate among females (5–15 years of age) increased to 90.93% ($n = 1363$) in 2017; it was 17% a decade ago. 32% of pregnant women beyond 15 years of age ($n = 490$) completed primary education until 5th standard. The impact of the education is shown in Table 2. The baseline study (2012) showed 34% women having vague understanding of linkage between missed menstrual period and pregnancy. Postintervention (2017), awareness increased to 89%. 11% and 33% could also link missed period with nausea and anorexia, respectively. Only 26.92% of pregnant women were aware of taking extra rest, while at the end of 5 years, 70.86% knew about taking adequate rest. 45% took 8 h rest at night with

Table 1: Morbidity pattern and supervised births in pregnant women with respect to their habitat

Vital data	Tribal community living in remote location, n (%)	Tribal community living adjoining block HQ, n (%)
Total number of anemia detected below 11 g/dl out of total tests done (n=1798)	834/860 (97)	881/990 (89)
Total number of anemia detected below 7 g/dl	26/860 (3)	109/990 (11)
Total number of pregnancy with medical complications (n=211)	135 (63.98)	76 (36.02)
Number of supervised deliveries at CHC	88/477 (18.4)	195/590 (33)
Number of supervised deliveries at DH	65/477 (13.6)	143/590 (24)
Number of unsupervised at home	190/477 (40)	175/590 (29)
Number of LBW <2 kg	21 (4.4)	28 (4.7)

CHC: Community health center, DH: District hospital, LBW: Low birth weight

Table 2: Impact of education on reproductive health parameters

Impact of formal education	Educated (secondary) (n=254)	Educated (primary) (n=237)
Gravida >3 (%)	21.7	30
Institutional delivery (%)	29	22
Hb <7 g (%)	20	27
First contact (hospital/trained health worker) (%)	33	24

Hb: Hemoglobin

few short spells in the daytime. Although the exact figure of pregnant mothers taking food twice a day was lacking, most of them did raise their intake of vegetables and government provided protein mix and iron tablets which is reflected in the reduction in the incidence of anemia. Previously, 95.28% of pregnant women consumed main food only once and rarely twice a day, often community shared their food with the pregnant woman. 7.59% of pregnant women consumed alcohol and tobacco during pregnancy. They continued with the good dietary practices taking rice mix dal for the first 3 days postdelivery and then liquid diet prepared from Jaggery (a product of sugar cane), Harua (pulses), and mix of local herbs having medicinal properties (immune modulators and antioxidants). 89.50% of women had a <3-year gap between two children. More than 33% of women (2017) wished to contact evidence-based health workers compared to only 19% in 2012. At the beginning of the program in 2012, 81% of the villagers preferred to contact traditional practitioners, who mostly used home-made herbal medicines for their illness and attended birth at home. After 5 years of intervention, more than 75% of the pregnant woman were convinced to give birth at the hospital, while 25% wished to deliver at home under the supervision of the trained Dhi (TBAs). Fifty percent also became aware of free 102/108 ambulance services. The health promotion activity and intervention increased the identification of high-risk pregnant women. It increased from 8.57% (n = 546) in 2014 and 12.57% (n = 2760) in 2016–13 and 15% (n = 1277) in 2017. MMR in tertiary care

hospitals covering the entire district of 1.4 million of mostly tribal population varied from 600 to 1100/100,000 live births (LBs), a situation that existed in mid-80 in urban India. The district recorded MMR of 240/100,000 LB,^[13-15] while our project area recorded 110/1LLB. As a result of 5 years of active intervention, the reproductive health indicators improved [Table 3].

DISCUSSION

In Chhattisgarh, maternal health indicators of the tribal women were below the national average. National Family Health Survey-4 (NFHS-4) data from rural Chhattisgarh and Bastar district showed 23.5% women married before the age of 18 years and 56.9% pregnant women to be anemic (<11 g %), while 75% women had supervised births in rural Chhattisgarh. The situation is however far worst in remote inaccessible areas due to conflicts and lack of awareness on evidence-based medicine. As a result, large inequality in quality health services persisted.^[16] The percentage of elderly population (>60 years) was 5%, lower than the national average of 8% (population census, 2011). The state experiences overburdened health system with a chronic shortage of trained health-care providers.^[17,18] As per the NFHS-4 report, the likelihood of getting medical care from a doctor was three times lower for ST women than other women; however, no data is available for ST population living in inaccessible conflict zones. Poor health status as well as the accessibility were the major criteria for selecting villages for project intervention [Table 1]. The program team developed active linkages with local health functionaries and assisted state government-run maternal and child health activities such as RMNCH + A that included free transport, drugs, and diet. The active health interventions closer to their hamlet by setting up additional facilities resulted in better reproductive outcomes. They were given routine TT injection, IFA, protein mix, and monetary incentives as per the NHM guidelines. Introduction of PoC diagnostics increased the community awareness on technology. As a result, demand for hemoglobin (Hb), blood group, urine card test, syphilis, HIV, blood sugar, blood pressure, Spo2, temperature,

Table 3: Impact of the health promotion and system strengthening over 5 years (2012-2017)

Factors	2012 (baseline)	2017 (postintervention)
Girls education (secondary level) >15 years of age (government initiative)	4.2% (n=667)	25% (n=336)
Mean age at 1 st pregnancy	17 (n=493)	22 (n=905)
Age of prim gravida (<19 years)	13.5% (n=667)	6.8% (n=336)
Supervised institutional birth	19.5% (n=462)	58% (n=294)
Hb level (>9 g %) - 3 rd trimester	29.16% (n=965)	50% (n=76)
Hb % <9 g % 1 st trimester (n=700)	-	609 (87%)
Hb % <9 g % second trimester (n=700)	-	336 (48%)
Third trimester	-	287 (41%)
1 st visit 1 st trimester	0%-16%*	41.81% (n=2358)
1 st visit 2 nd trimester	35%	37.31% (n=2358)
1 st visit 3 rd trimester	39%	20.86% (n=2358)
Average birth weight (kg)	55% <2.6*	2.67 (n=1260)
LBW in percentage (kg)	45% <2.5*	16.58% (n=1260)
Live birth percentage	NA	94.00% (n=1686)
Still birth in percentage	NA	6.00% (n=1686)
Mean Hb level in PNC period (g)	NA	8.6% (n=656)

*N=965, Hb: Hemoglobin, LBW: Low birth weight, PNC: Postnatal care, NA: Not available

and pregnancy test increased. It led to a better diagnosis of morbid condition and treatment/referrals. The mobile application developed for link management protocol (LMP) tracking, management information system (MIS) system, and AV Aids (health videos) to promote BCC increased awareness on LMP and missed periods and enrolment in the public health system to reap the social benefits. A positive correlation was observed between IEC activities, health literacy, formal education, and health-seeking behavior and early registration [Table 2]. To improve the literacy among the female tribal children, government has set up Ashram Shala (residential schools) under Sarva Shiksha Abhiyan. We regularly sensitized teachers and students about menstrual hygiene, importance of last menstrual period, balanced diet, nutrition, iron supplementation, and deworming. Female literacy level increased rapidly due to setting up of government residential schools. Lack of a dedicated monitoring and evaluation framework and an inability to address social determinants of health were some of the factors found to have reduced the impact of the RMNCH + A strategy.^[19] The MIS system assisted field staff to efficiently evaluate and monitoring social indicators and record the health outcomes, and self-performance audit improved data collection and data entry/analysis. The manpower (capacity building) development of primary health workers imparted through regular task-oriented and hand-on AV-aided training program also improved health literacy

and technical capabilities. As a result of concerted efforts of both project and government team, the number of supervised vaginal births increased at primary health centers [Table 3]. Adolescent pregnancy rate (<19 years) declined from 13.5% (2012) to 6.8% (2016). Hb level >9 g% (third trimester) increased from 29.68% (2012) to 50% (2017). Supervised births and high-risk referrals increased from 19.5% (2014) to 58% (2017) and 8.5% (2014) to 13.1% (2017), respectively. Institutional deliveries increased due to optimal utilization of the infrastructure, manpower, medicine, transport network, and logistics. The women in general were reluctant to deliver at higher centers due to the fear of surgical procedures, episiotomy, or cesarean sections. We encouraged them to continue their good practices.^[20] Traditionally, they practice restriction of high calorie and fatty diet to keep the baby small (2.0–2.5 kg) that resulted in mostly normal births. They worked until labor pain starts and preferred birthing in squatting position and believed it facilitates natural birth and prevents perineal injuries. They practiced late cord clamping (until pulsation stops or placenta delivered). During the postnatal period, traditionally, they take rest and isolate themselves for 1–2 months. The technology (ICT and PoC diagnostics) intensive health promotion strategy not only improved their understanding of good traditional practices but also their health-seeking behavior.

CONCLUSION

The innovative triage of collective activism, social marketing, and system correction and strengthening appeared to be one of the best fit intervention models that improved the health-care delivery mechanism in such inaccessible conflict regions, but the health indicators continue to lag much behind the rest of the rural or urban Chhattisgarh and India (NFHS-4). Therefore, lot more concerted effort is required to be put in by all the stakeholders, so that the facilities provided under NHM can be enhanced and made available to the unreached at par with others in the future.

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Conflicts of interest

There are no conflicts of interest.

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