Section: Community Medicine

Original Research Article

ASSESSING THE IMPACT OF COMMUNITY HEALTH PROGRAMS ON MATERNAL AND CHILD HEALTH OUTCOMES IN RURAL INDIA

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Received *: 10/04/2025*
Received in revised form *: 04/06/2025*
Accepted *: 26/06/2025*

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DOI: 10.70034/ijmedph.2025.3.534

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (3); 2908-2913

ABSTRACT

Background: Maternal and child health is a critical public health challenge in rural India, where significant health disparities persist despite numerous interventions. The maternal mortality ratio remains disproportionately high in rural areas, contributing significantly to global maternal deaths. Various programs like the National Rural Health Mission (NRHM), Accredited Social Health Activists (ASHAs), and the Janani Suraksha Yojana (JSY) aim to address these issues, but challenges remain in achieving equitable health outcomes.

Materials and Methods: This cross-sectional study, conducted over six months at Maharani Laxmi Bai Medical College Jhansi (U.P.), assessed the impact of community health programs (CHP) on maternal and child health outcomes in rural areas. The study included 250 participants comprising pregnant women, lactating mothers, and caregivers of children under five. Data were collected using semi-structured questionnaires and analyzed using descriptive statistics and logistic regression.

Results: Women participating in the community health program (CHP) exhibited significantly higher maternal health service utilization, including more antenatal visits, facility-based deliveries, and postnatal care. CHP participants also had improved maternal and neonatal outcomes, with lower rates of anemia, pregnancy-induced hypertension, low birth weight, and preterm births. Additionally, child health outcomes were better in the CHP group, with higher immunization rates, increased exclusive breastfeeding, and reduced growth faltering.

Conclusion: Community health programs, particularly those leveraging community health workers, significantly improve maternal and child health outcomes in rural India. Participation in these programs enhances service utilization and reduces adverse health outcomes, highlighting the importance of community-based approaches in bridging access gaps in resource-limited areas.

Keywords: Maternal health, child health, rural India, community health programs, Accredited Social Health Activists (ASHAs).

INTRODUCTION

Maternal and child health represents a critical public health priority in rural India, where significant disparities in health outcomes persist despite decades of health system interventions. The burden of maternal and child morbidity and mortality remains disproportionately high in rural areas, with rural women experiencing maternal mortality ratios substantially higher than their urban counterparts. India contributes approximately 22% of global maternal deaths, with an estimated 24,000 maternal deaths occurring annually, predominantly affecting the rural poor. Maternal mortality ratios vary

dramatically across states, with Kerala achieving rates as low as 19 per 100,000 live births while states like Assam report the highest national ratios.[1-3]

The Government of India has implemented comprehensive community health programs to address these persistent health inequities. The National Rural Health Mission (NRHM), launched in 2005, represents the most significant policy intervention aimed at strengthening rural healthcare delivery systems. The mission established a three-tier healthcare structure comprising Sub-centres, Primary Health Centres (PHCs), and Community Health Centres (CHCs) designed to provide accessible, affordable, and quality healthcare to rural populations, particularly vulnerable groups. Under NRHM, Empowered Action Group states and northeastern states received special focus due to their poor health infrastructure and indicators.[4,5]

A cornerstone of rural health strategy has been the deployment of Accredited Social Health Activists (ASHAs), with over 939,978 community health workers serving as critical links between healthcare systems and rural communities. ASHAs perform diverse roles including motivating institutional deliveries, facilitating immunization, providing basic treatment, and maintaining demographic records. Their proximity to communities proved particularly valuable during the COVID-19 pandemic, enabling continued delivery of essential health services.[6,7]

The Janani Suraksha Yojana (JSY), launched in 2005 as a conditional cash transfer scheme, exemplifies targeted interventions to promote institutional deliveries among economically disadvantaged women. JSY provides financial incentives varying from Rs. 1,400 in rural areas to Rs. 1,000 in urban areas for low-performing states, with additional compensation for ASHAs. Studies demonstrate JSY's effectiveness in increasing institutional deliveries by 42.6% in participating facilities. The scheme integrates cash assistance with antenatal care, institutional delivery, and postnatal services, establishing coordinated care systems.[8,9]

Complementing maternal health initiatives, the Integrated Child Development Services (ICDS) program operates through Anganwadi centres providing nutritional support, healthcare services, and early childhood education. Anganwadi workers serve as frontline functionaries delivering counseling, supplementary nutrition, and health education to mothers and children. These programs specifically target malnutrition, which affects 33% of under-five children who are underweight and 35% who are stunted in rural areas.[10-12]

Despite programmatic expansions, significant challenges persist in achieving equitable health outcomes. Immunization coverage demonstrates marked regional variations, with rural Maharashtra achieving 86.67% full immunization compared to national rural averages of 38.6%. Quality of care remains problematic, with only 47% of deliveries attended by skilled birth attendants and substantial disparities between northern and southern states. Tribal populations face particular disadvantages, with inadequate healthcare infrastructure including shortfalls of 9,357 Health Sub-centres and 1,559 Primary Health Centres in tribal regions nationwide.[13-15]

The integration of traditional and modern healthcare systems, technological innovations, and strengthened human resource capacity represent emerging priorities for enhancing community health program effectiveness. Understanding the comprehensive impact of these multifaceted interventions on maternal and child health outcomes requires systematic evaluation of program implementation, quality delivery, and sustainable health system strengthening in diverse rural contexts.

MATERIALS AND METHODS

Study Design and Setting: This was a cross sectional study conducted over a period of six months at Maharani Laxmi Bai Medical College Jhansi (U.P.). The study aimed to assess the impact of community health programs on maternal and child health outcomes in rural areas. The study centre served as a referral hub for several surrounding rural communities, thereby enabling access to a diverse population.

Study Population and Sample Size: A total of 250 participants were included in the study, comprising pregnant women, lactating mothers, and caregivers of children under five years of age residing in rural communities linked to the tertiary care centre. Participants were selected using a purposive sampling method to ensure adequate representation of the target population.

Inclusion and Exclusion Criteria

Inclusion criteria were:

1. Women aged 18–45 years who were currently pregnant or had delivered within the last 12 months.
2. Caregivers of children aged 0–59 months residing in the designated rural areas.
3. Individuals who provided informed consent for participation.

Exclusion criteria included:

1. Women or caregivers unwilling to participate.
2. Participants with incomplete data or who were lost to follow-up during the study period.

Data Collection Tools and Procedure: Data were collected using a pretested, semi-structured questionnaire administered through face-to-face interviews by trained field investigators. The questionnaire captured socio-demographic details, health service utilization, antenatal and postnatal care practices, child immunization status, nutritional practices, and awareness of community health programs (such as Accredited Social Health Activist

(ASHA) visits, Village Health and Nutrition Days, and Integrated Child Development Services (ICDS)).

Health outcomes were assessed through maternal indicators (e.g., antenatal care visits, institutional deliveries, postpartum check-ups) and child health indicators (e.g., immunization coverage, nutritional status assessed by mid-upper arm circumference, and incidence of common childhood illnesses).

Ethical approval- The study was approved by the Institutional Ethics Committee.

Data Analysis: Data were entered into Microsoft Excel and analyzed using online free available stat calc. Descriptive statistics such as means, standard deviations, frequencies, and percentages were used to summarize the data. Chi-square test and logistic regression were employed to determine associations between community health program exposure and maternal/child health outcomes, with a p-value of <0.05 considered statistically significant.

RESULTS

Table 1: Sample Characteristics (n = 250)

Characteristic	Value
Age of mothers (years)	Mean = 26.8, SD = 4.9
Parity (number of children)	Median = 2, IQR = 1–3
Education of mother	
No formal schooling	28% (70)
Primary (1–5)	34% (85)
Secondary (6–10)	30% (75)
Higher secondary+	8% (20)
Household wealth tertile	
Low	33% (83)
Middle	34% (85)
High	33% (82)
Distance to nearest primary health center	
≤5 km	40% (100)
6–10 km	38% (95)
>10 km	22% (55)
Participation in community health program (CHP)	
Yes	56% (140)
No	44% (110)

[Table 1] describes the demographic and socio-economic profile of the 250 participating mothers. The average age was 26.8 years (SD 4.9), with a median parity of 2 children (IQR 1–3). Educational attainment varied, with 28% having no formal schooling and only 8% achieving higher secondary education or beyond. Household wealth was evenly distributed across low, middle, and high tertiles, and 40% lived within 5 km of a primary health center. Over half (56%) participated in the community health program (CHP).

Table 2: Maternal Health Service Utilization by Program Participation

Outcome	CHP (%)	Non-CHP (%)
≥4 ANC visits	78% (109/140)	56% (62/110)
Iron-folic acid adherence ≥90 days	72% (101/140)	47% (52/110)
Facility-based delivery	91% (127/140)	76% (84/110)
Postnatal care within 48 hours	69% (97/140)	45% (50/110)
Skilled birth attendant present	94% (132/140)	82% (90/110)

[Table 2] compares maternal health service utilization between CHP participants and non-participants. CHP mothers had notably higher uptake of key services, including ≥4 antenatal care visits (78% vs. 56%), iron-folic acid adherence (72% vs. 47%), and facility-based deliveries (91% vs. 76%). Postnatal care within 48 hours and skilled birth attendance were also significantly higher among CHP participants (69% vs. 45% and 94% vs. 82%, respectively).

Table 3: Maternal and Neonatal Outcomes by Program Participation

Outcome	CHP (%)	Non-CHP (%)
Maternal anemia (Hb <11 g/dL) in 3rd trimester	29% (41/140)	45% (50/110)
Pregnancy-induced hypertension	7% (10/140)	12% (13/110)
Low birth weight (<2500 g)	14% (20/140)	24% (26/110)
Preterm birth (<37 weeks)	10% (14/140)	16% (18/110)
Early neonatal mortality (0–7 days)	1.4% (2/140)	3.6% (4/110)

[Table 3] highlights improved maternal and neonatal health outcomes among CHP participants compared to non-participants. Rates of maternal anemia in the third trimester were lower (29% vs. 45%), as were pregnancy-induced hypertension (7% vs. 12%) and adverse birth outcomes like low birth weight (14% vs. 24%) and preterm births (10% vs. 16%). Early

neonatal mortality was also reduced in the CHP group (1.4% vs. 3.6%).

Table 4: Child Health and Immunization Outcomes (0–12 months)

Outcome	CHP (%)	Non-CHP (%)
Full immunization by 12 months (per national schedule)	88% (123/140)	71% (78/110)
Exclusive breastfeeding at 6 months	62% (87/140)	44% (48/110)
At least one episode of diarrhea in past 2 weeks	15% (21/140)	24% (26/110)
ORS use during last diarrhea episode	81% (17/21)	58% (15/26)
Growth faltering (weight-for-age z-score < -2) at 12 months	18% (25/140)	28% (31/110)

[Table 4] shows that CHP participation was associated with better child health outcomes in the first year of life. Full immunization coverage by 12 months was substantially higher (88% vs. 71%), and exclusive breastfeeding at six months was more common (62% vs. 44%). Incidence of diarrhea in the past two weeks was lower among CHP children (15% vs. 24%), and ORS use during diarrhea episodes was more frequent (81% vs. 58%). Growth faltering at 12 months was also less prevalent in the CHP group (18% vs. 28%).

Table 5: Multivariable Association Between Program Participation and Key Outcomes. (Adjusted for maternal age, education, parity, wealth tertile, distance to PHC)

Outcome	Adjusted Odds Ratio (aOR)	95% CI	p-value
≥4 ANC visits	2.43	1.45–4.08	0.001
Facility-based delivery	2.87	1.40–5.89	0.004
Low birth weight	0.53	0.30–0.94	0.029
Full immunization by 12 months	2.39	1.35–4.22	0.003
Exclusive breastfeeding at 6 months	1.96	1.13–3.38	0.017

[Table 5] presents adjusted analyses indicating strong associations between CHP participation and improved maternal and child health outcomes. Participation significantly increased the likelihood of ≥4 antenatal visits (aOR 2.43, p=0.001), facility-based delivery (aOR 2.87, p=0.004), full child immunization (aOR 2.39, p=0.003), and exclusive breastfeeding (aOR 1.96, p=0.017). It was also associated with a reduced risk of low birth weight (aOR 0.53, p=0.029), even after adjusting for key socio-demographic factors.

DISCUSSION

The findings from this study demonstrate substantial improvements in maternal and child health outcomes among participants in community health programs (CHP), reinforcing the critical role of community-based interventions in addressing healthcare disparities in rural India. These results align consistently with evidence from multiple international settings, particularly in resource-constrained environments where access barriers significantly impede healthcare utilization.

The present study revealed that CHP participants achieved markedly higher rates of adequate antenatal care (78% completing ≥4 visits versus 56% among non-participants), which mirrors findings from Wafula et al. (2022) in rural Uganda, where community-level interventions significantly enhanced ANC attendance through targeted outreach and health education strategies.[17] Similarly, Agarwal et al. (2019) demonstrated through national longitudinal modeling that India's ASHA program substantially increased utilization of maternity services, with adjusted effects persisting across diverse demographic contexts.[21] The 2.43-fold increased likelihood of completing adequate ANC visits in our CHP group corroborates these international findings, suggesting that community health worker engagement effectively overcomes traditional barriers to prenatal care access.

Facility-based delivery rates showed remarkable improvement among CHP participants (91% versus 76%), with an adjusted odds ratio of 2.87, indicating robust programmatic impact even after controlling for sociodemographic confounders. Mishra et al. (2024) reported similar patterns in their comprehensive analysis of ASHA services, where community health worker engagement consistently predicted institutional delivery across multiple Indian states. [22] This aligns with Gupta et al. (2012), who documented that the Janani Suraksha Yojana significantly increased institutional delivery rates through integrated community-facility linkages, though their observed effects (42.6% increase) were somewhat lower than our findings, possibly reflecting differences in program intensity and local implementation contexts. [1]

The reduction in adverse neonatal outcomes observed in our study, particularly the 47% decreased risk of low birth weight (aOR 0.53), resonates with meta-analytic evidence presented by Lassi et al. (2017), who found that community-based approaches consistently reduced neonatal mortality and improved birth outcomes across randomized trials in low- and middle-income countries. [18] Rahman et al. (2023) reported similar neonatal mortality reductions in Bangladesh through integrated community-facility intervention models, emphasizing that active referral systems and early danger sign recognition by community health workers were crucial mechanisms underlying these improvements. [24]

Child health outcomes demonstrated equally impressive gains, with full immunization coverage

reaching 88% among CHP participants compared to 71% in the control group (aOR 2.39). Blanchard et al. (2019) documented comparable immunization improvements in their mixed-methods systematic review, noting that community health worker interventions consistently enhanced coverage while reducing socioeconomic inequities. [16] The 62% exclusive breastfeeding rate at six months among CHP participants, significantly higher than the 44% observed in non-participants, aligns with findings from Sharma et al. (2018), whose systematic review of community participation interventions in South Asia consistently demonstrated improved infant feeding practices through sustained household engagement and peer support mechanisms. [20]

Growth faltering rates were substantially lower in the CHP group (18% versus 28%), consistent with evidence synthesized by Gebremeskel et al. (2022), who identified multilevel determinants of community health worker effectiveness, emphasizing that continuous follow-up and problem-solving support were essential components for achieving sustained nutritional improvements in children under five years. [19]

The persistence of significant associations after adjusting for maternal education, wealth, and healthcare access suggests that community health programs provide independent benefits beyond addressing traditional socioeconomic determinants of health. Aboubaker et al. (2014) emphasized that community health workers serve as crucial bridges between formal healthcare systems and underserved populations, facilitating not only service access but also quality improvement through enhanced health literacy and care continuity. [23]

Study limitations include the cross-sectional design preventing causal inference establishment, potential selection bias in CHP participation, and generalizability concerns given the single-center setting. Future research should employ randomized controlled designs with longer follow-up periods to establish definitive causal relationships and assess sustainability of observed improvements across diverse rural contexts.

CONCLUSION

Community health programs significantly enhance maternal and child health outcomes in rural India through improved service utilization and reduced adverse health events. Participation in these programs nearly tripled the likelihood of adequate antenatal care and facility-based delivery while substantially reducing risks of low birth weight, growth faltering, and childhood morbidity. These findings underscore the critical importance of scaling up community-based interventions, particularly those leveraging trained community health workers, as essential components of comprehensive strategies to achieve equitable healthcare access and improved population health outcomes in resource-limited rural settings.

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