Performance and Challenges of Community Health Workers in Improving Neonatal Health Outcomes in India

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Introduction

An adverse neonatal health outcome, defined as the "occurrence of neonatal mortality, low birth weight, neonatal infections, or stillbirth," represents a significant health concern worldwide (UNICEF, 2012). In 2022, an estimated 2.4 million neonatal deaths, 2 million stillbirths, and 19 million cases of low birth weights and neonatal infections occurred (WHO, 2024; Dayal et al., 2021). India contributes significantly to the global share, reporting 0.42 million neonatal deaths, 0.34 million stillbirths, and 3 million instances of low birth weight (LBW) and neonatal infections in 2022 (World Bank, 2022; Fadel et al., 2015). In addition to these adverse outcomes, deficiencies in positive neonatal care practices, notably exclusive breastfeeding and timely immunization, continue to impede optimal neonatal health outcomes in many regions.

According to the World Health Organization (WHO), adverse neonatal outcomes persist primarily due to low coverage of Maternal and Newborn Healthcare (MNH) services, including Antenatal care (ANC), Institutional Delivery (ID), and Postnatal Care (PNC) (WHO, 2022). Notably, PNC encompasses critical early neonatal interventions such as promoting exclusive breastfeeding and immunization. Nonetheless, with the timely and adequate implementation of these MNH services, it is possible to reduce the prevalence of adverse outcomes by 70% (UN, 2015). A promising strategy to improve neonatal outcomes arises from within the community, specifically through the engagement of Community Health Workers (CHWs) (Blanchard et al., 2021).

A CHW, typically a member of the local community, delivers preventive, promotional, and rehabilitative care, particularly in areas where access to healthcare is limited. Since 2005, the National Rural Health Mission (NRHM) has recruited and trained an extensive cadre of 0.87 million CHWs, referred to as Accredited Social Health Activists (ASHAs) (NRHM, 2015). These ASHAs are trained to reach out routinely and counsel women and their families on ANC, safe delivery, and PNC through home visits, all aimed at reducing maternal and neonatal mortality (Lassi et al., 2015).

Despite the program's extensive reach, the impact of ASHAs on neonatal health outcomes varies significantly across different regions. For instance, neonatal mortality has only decreased by two percentage points, from 22% in 2019 to 20% in 2020. In comparison, the rates of LBW and stillbirth have declined by just one percentage point each, from 17% to 16% and 13.9% to 12.9%, respectively, during the same time frame (PIB, 2022). Additionally, neonatal outcomes differ among the 723 districts in India, with 275 districts experiencing high mortality rates of 35 or more deaths per 1,000 live births, 233 districts showing medium mortality rates of 25 per 1,000 live births, and 176 districts reporting low mortality rates of fewer than 18 per 1,000 live births (PIB, 2022). Similarly, improvements in protective newborn care practices have been uneven; exclusive breastfeeding and immunization coverage, key interventions promoted by ASHAs, show only modest gains in many areas, reflecting persistent regional disparities.

Given the substantial investment in ASHAs across India, the slow and inconsistent pace of improvement in neonatal health outcomes, including the limited reduction in adverse outcomes and modest increases in positive practices, has become a matter of concern. Consequently, it is crucial to evaluate the factors that influence ASHAs in mitigating these adverse outcomes and in improving these neonatal health indicators..

Methodology

The study is based on a systematic review and meta-analyses. Bibliographic databases, including PubMed, Scopus, Embase, and Web of Science, were searched using relevant keywords to obtain the literature published from 2005 to December 2024. The inclusion criteria comprised neonates who experienced adverse health outcomes such as low birth weight, illness from infections, or death within the first 28 days of life, as well as those whose mothers had stillbirths. In addition, studies reporting outcomes related to essential neonatal care practices (exclusive breastfeeding and immunization) were included to capture improvements associated with CHW interventions. Studies published in or after 2005, the year the National Rural Health Mission (NRHM) was launched and when ASHAs were recruited in India, were considered. Potentially eligible studies were selected following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. In total, 9,961 studies were obtained as search results, of which 20 were included in the systematic review and 29 in the meta-analysis.

The quality of the systematic literature review was evaluated using the Cochrane quality assessment tool, which comprises nine parameters. The quality assessment for meta-analysis was performed using the Cochrane Risk of Bias (RoB) tool, which includes six parameters (Deeks et al., 2022). Data from all eligible studies were extracted using a template developed in Microsoft Excel and subsequently imported into the Cochrane Review Manager (RevMan) software for meta-analysis. The pooled effect size (Relative Risk, RR) for the effectiveness of ASHAs in improving neonatal health outcomes was estimated using random-effect models.

Results

Figures 1-6 illustrate forest plots, presenting the impact of ASHAs on six key neonatal health outcomes: neonatal mortality, stillbirth, low birth weight, neonatal illness, exclusive breastfeeding, and Immunization, respectively. The meta-analysis indicates that contact with ASHAs had a positive effect on all six outcomes. The pooled RR for neonatal mortality associated with contact with ASHAs was estimated at 0.78 (95% CI 0.70-0.87), indicating a 22% reduction in neonatal mortality among the intervention group compared to the control group (Figure 1). The pooled RR for stillbirth (Figure 2) was estimated at 0.56 (95% CI 0.29-1.05), reflecting a 44% reduction in stillbirth in the intervention group compared to the control group. For LBW (Figure 3), the pooled RR was estimated at 0.82 (95% CI 0.67-1.00), which represents an 18% reduction in LBW in the intervention group supported by ASHAs compared to the control group. The pooled RR for neonatal illness (Figure 4) was estimated at 0.89 (95% CI 0.84-0.94), indicating a 11% reduction in neonatal illness in the intervention group. The pooled RR for exclusive breastfeeding associated with contact with ASHAs was estimated at 1.07 (95% CI 1.03-1.11), indicating a 7% increase in exclusive breastfeeding practices among the intervention group compared to the control group (Figure 5). The pooled RR for immunization associated with contact with ASHAs was estimated at 1.20 (95% CI 1.02-1.41), indicating a 20% increase in immunization among the intervention group compared to the control group (Figure 6). Among the six neonatal health outcomes, the least improved neonatal outcome is exclusive breastfeeding, with a mere 7% improvement. In contrast, immunization achieved one of the highest gains (a 20% increase), reflecting the varying degree of impact across different neonatal outcomes.

Based on the systematic review, several factors were identified as critical enablers or barriers affecting ASHA performance, as summarized in Figure 7. These factors span multiple domains – individual, cultural/social, community, and health system factors – and help explain the heterogeneity in ASHAs' effectiveness in improving neonatal outcomes across regions. At the individual level, knowledge is the most frequently discussed factor, with mixed results reported. Studies reported that adequate knowledge improved ASHA performance in reducing neonatal mortality (Srivastava et al.,

2021), neonatal illness (Devi et al., 2023; Shrivastava et al., 2012), and LBW (Patel et al., 2024). However, others highlighted significant gaps—e.g., 50.4% of ASHAs were unaware of emergency referral procedures (Gogia et al., 2011; Srivastava et al., 2021). Geographic remoteness further constrained ASHA reach, particularly in regions with high neonatal mortality and illness (Srivastava et al., 2021; Villa et al., 2014).

The most frequently discussed cultural factors are patriarchal norms, caste dynamics, and linguistic barriers. These impediments hindered ASHA communication and the uptake of services, particularly in neonatal mortality and illness (Deshmukh et al., 2022; Dettrick et al., 2014; Karvande et al., 2016; Singh et al., 2012). Cultural misalignment was found to affect LBW negatively and illness care in conservative communities. However, a few studies presented mixed views, where cultural familiarity or aligned beliefs helped foster acceptance of breastfeeding in select contexts (Patel et al., 2024). Still, household dynamics, religious discrimination, and socio-occupational hierarchies consistently posed challenges to ASHA authority, particularly in states such as Rajasthan, Uttar Pradesh, and Bihar (Awasthi et al., 2015; Deshmukh et al., 2022; Singh et al., 2012).

At the community level, acceptance of ASHAs acted as a facilitator in reducing LBW and neonatal illness and improving breastfeeding rates (Gogia et al., 2011; Patel et al., 2024; Prabhughate et al., 2018; Srivastava et al., 2021; Vir et al., 2014). In contrast, community resistance emerged as a significant barrier in contexts such as immunization and neonatal mortality, where mistrust and misinformation persisted (Chakraborty et al., 2021; Deshmukh et al., 2022; Shet et al., 2017; Vir et al., 2014).

The primary challenge identified within the health system is Inadequate resources, particularly immunization, neonatal mortality, and neonatal illness (Awasthi et al., 2015; Deshmukh et al., 2022). Poor infrastructure and limited access to technology further hindered timely care (Dettrick et al., 2014; Gogia et al., 2011; Singh et al., 2012). Notably, while technology improved recordkeeping and task efficiency in some interventions, other studies showed it added to workload or was inaccessible in remote areas, indicating mixed results (Peri et al., 2022). Similarly, ASHAs frequently reported poor relationships with health facility staff, undermining their morale and referral success (Deshmukh et al., 2022). Training interventions showed promise (Prabhughate et al., 2018) but lacked consistency (Deshmukh et al., 2022), and political will was variable (Singh et al., 2012). Overall, health system constraints disproportionately affected outcomes like neonatal illness and immunization in underserved geographies.

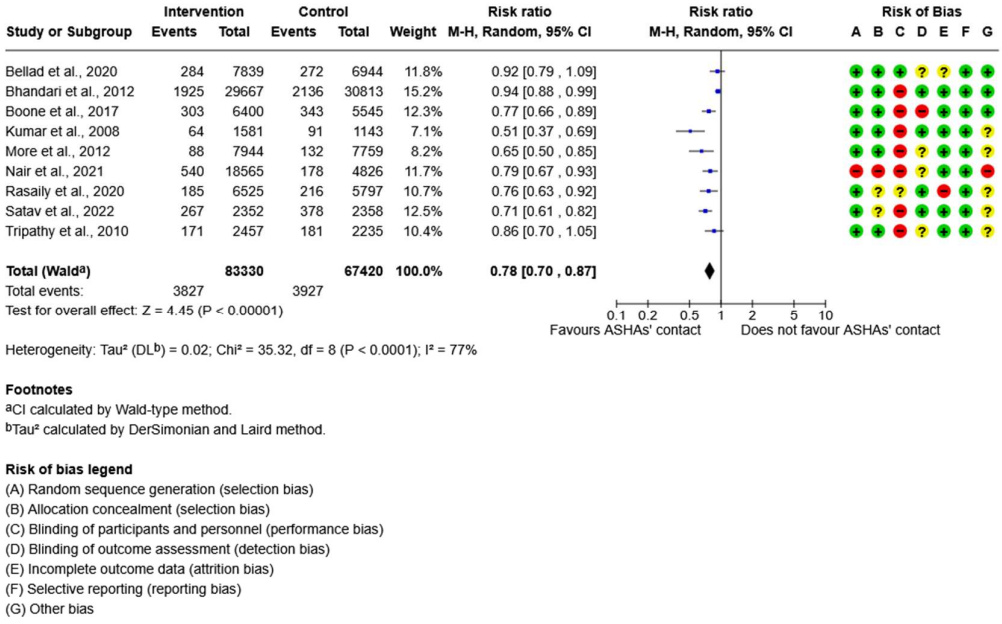
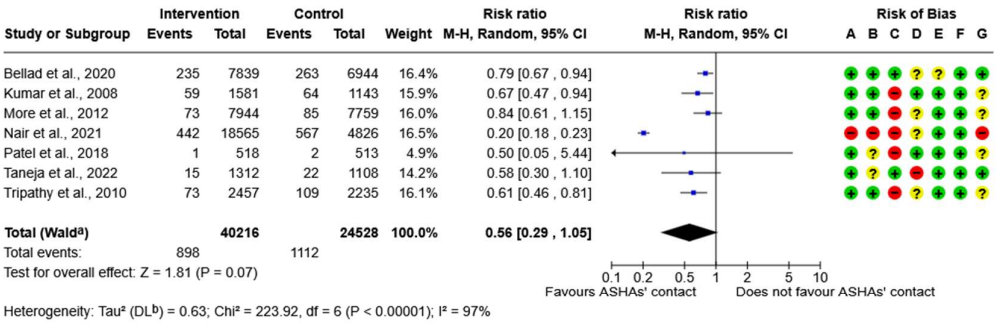


Figure 1: Effectiveness of ASHA in reducing neonatal mortality



Heterogeneity: Tau² (DL[b]) = 0.63; Chi² = 223.92, df = 6 (P < 0.00001); I² = 97%

Footnotes

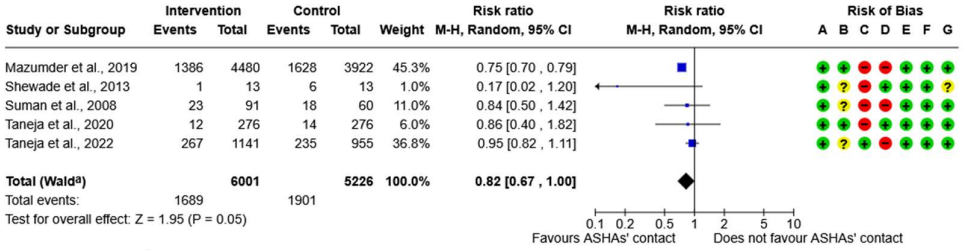
[a]CI calculated by Wald-type method.

[b]Tau² calculated by DerSimonian and Laird method.

Risk of bias legend

(A) Random sequence generation (selection bias)
(B) Allocation concealment (selection bias)
(C) Blinding of participants and personnel (performance bias)
(D) Blinding of outcome assessment (detection bias)
(E) Incomplete outcome data (attrition bias)
(F) Selective reporting (reporting bias)
(G) Other bias

Figure 2: Effectiveness of ASHAs in reducing stillbirths



Heterogeneity: Tau² (DL[b]) = 0.02; Chi² = 11.09, df = 4 (P = 0.03); I² = 64%

Footnotes

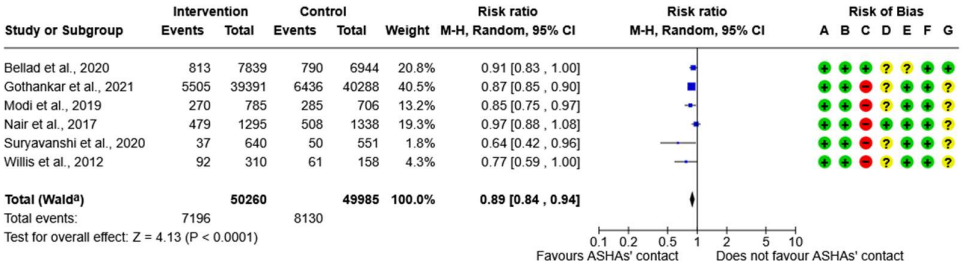
[a]CI calculated by Wald-type method.

[b]Tau² calculated by DerSimonian and Laird method.

Risk of bias legend

(A) Random sequence generation (selection bias)
(B) Allocation concealment (selection bias)
(C) Blinding of participants and personnel (performance bias)
(D) Blinding of outcome assessment (detection bias)
(E) Incomplete outcome data (attrition bias)
(F) Selective reporting (reporting bias)
(G) Other bias

Figure 3: Effectiveness of ASHAs in reducing Low Birth Weight



Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 8.39, df = 5 (P = 0.14); I² = 40%

Footnotes

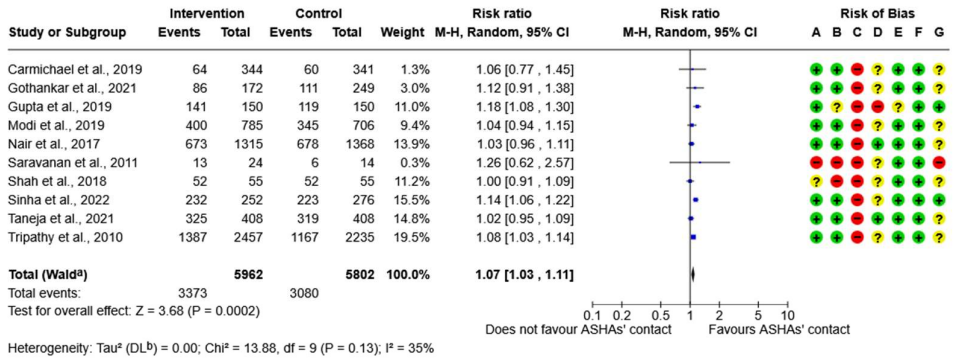
[a]CI calculated by Wald-type method.

[b]Tau² calculated by DerSimonian and Laird method.

Risk of bias legend

(A) Random sequence generation (selection bias)
(B) Allocation concealment (selection bias)
(C) Blinding of participants and personnel (performance bias)
(D) Blinding of outcome assessment (detection bias)
(E) Incomplete outcome data (attrition bias)
(F) Selective reporting (reporting bias)
(G) Other bias

Figure 4: Effectiveness of ASHAs in reducing neonatal illness



Heterogeneity: Tau² (DL[b]) = 0.00; Chi² = 13.88, df = 9 (P = 0.13); I² = 35%

Footnotes

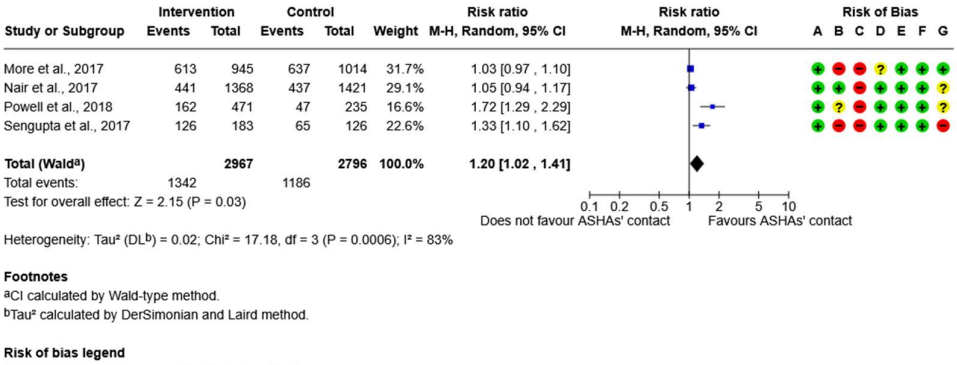
[a]CI calculated by Wald-type method.

[b]Tau² calculated by DerSimonian and Laird method.

Risk of bias legend

(A) Random sequence generation (selection bias)
(B) Allocation concealment (selection bias)
(C) Blinding of participants and personnel (performance bias)
(D) Blinding of outcome assessment (detection bias)
(E) Incomplete outcome data (attrition bias)
(F) Selective reporting (reporting bias)
(G) Other bias

Figure 5: Effectiveness of ASHAs in improving exclusive breastfeeding



Heterogeneity: Tau² (DL[b]) = 0.02; Chi² = 17.18, df = 3 (P = 0.0006); I² = 83%

Footnotes

[a]CI calculated by Wald-type method.

[b]Tau² calculated by DerSimonian and Laird method.

Risk of bias legend

(A) Random sequence generation (selection bias)
(B) Allocation concealment (selection bias)
(C) Blinding of participants and personnel (performance bias)
(D) Blinding of outcome assessment (detection bias)
(E) Incomplete outcome data (attrition bias)
(F) Selective reporting (reporting bias)
(G) Other bias

Figure 6: Effectiveness of ASHAs in improving immunization

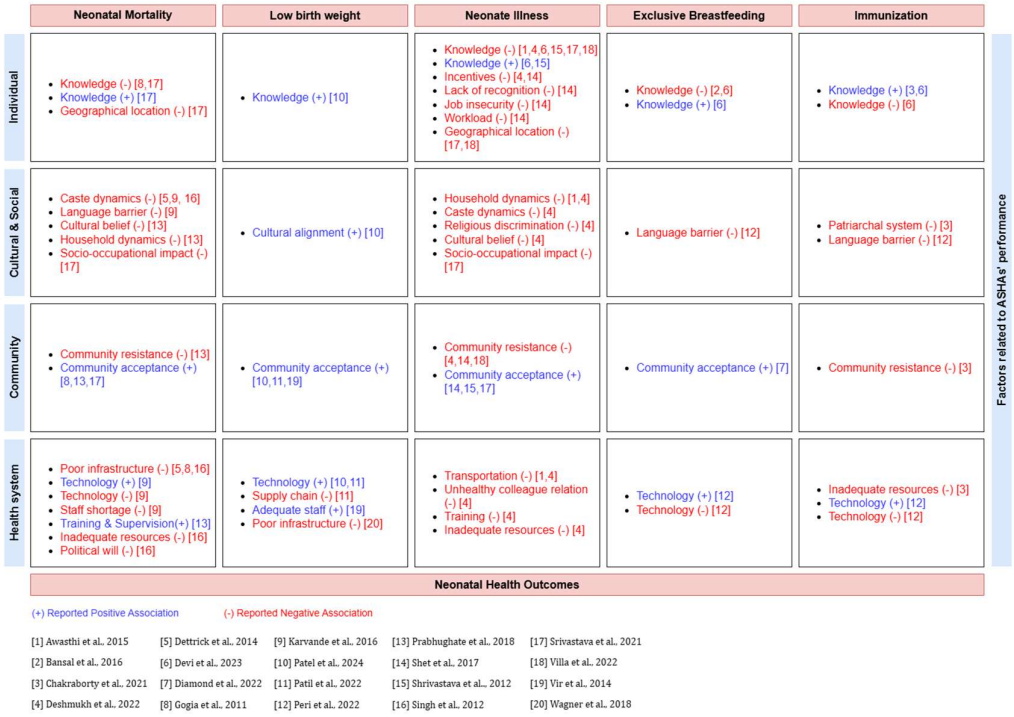


Figure 5: Factors impacting the effectiveness of ASHAs in improving neonatal health outcomes

Conclusions

The results indicate a predominantly positive impact of ASHAs in improving neonatal health outcomes, although a few factors have contributed to mixed results. These findings reaffirm the importance of continued investment in the ASHA workforce to enhance the quality, frequency, and content of care in the context of India's national health programmes. Moreover, this review provides policymakers in other LMICs with relevant insights for implementing or refining community-based neonatal health strategies. The findings suggest that with adequate support, training, and supervision, ASHAs can improve service uptake in underserved populations, particularly when their roles are clearly defined and embedded within functional health systems. While this review did not involve direct consultation with stakeholders, such engagement in future systematic reviews could yield more programmatically actionable evidence.

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