



COMMUNITY HEALTH WORKERS IN MATERNAL AND CHILD HEALTH PROGRAMS: EVIDENCE FROM PUBLIC HEALTH INTERVENTIONS

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ABSTRACT

Persistent preventable maternal, neonatal, and child morbidity and mortality reflect inequities in timely access to effective care, particularly in settings with limited health workforce capacity. Community health workers (CHWs) have been deployed to extend preventive services, support household decision making, identify risks, and connect families with health facilities. This critical narrative review examines evidence from maternal care, newborn interventions, childhood immunization, nutrition, and illness management, focusing on effectiveness, mechanisms, contextual variation, and sustainability. Across intervention domains, CHW programmes show relatively consistent improvements in antenatal attendance, selected preventive practices, caregiver engagement, and service contact. Evidence of reductions in morbidity and mortality is less uniform. Intensive home based newborn programmes have reported survival benefits, whereas other interventions improved referrals or treatment practices without demonstrable mortality gains. Variation in intervention intensity, training, remuneration, supervision, supply availability, and facility readiness complicates attribution and limits transferability across settings. The review also identifies gaps in causal evaluation, longer term follow up, equity analysis, and implementation cost evidence. To integrate these findings, it proposes a Community-to-Outcome Pathway Framework linking programme capacity, community engagement, service access and quality, health outcomes, and equitable, sustained impact through monitoring and adaptation. The central implication is that CHW expansion must be matched by reliable clinical services, workforce support, and outcome oriented accountability to achieve lasting maternal and child health gains.

KEYWORDS: Community health workers; maternal health; child health; public health interventions; health equity; primary health care; health systems strengthening.

1. INTRODUCTION

Although maternal and child survival has improved over recent decades, preventable deaths remain a persistent reflection of unequal access to effective health care. An estimated 260,000 women died from causes related to pregnancy and childbirth in 2023, while 4.9 million children died before their fifth birthday in 2024, including approximately 2.3 million newborns. These deaths are concentrated in settings where poverty, distance, fragile health systems, and delayed treatment restrict access to timely and appropriate care. Reducing mortality therefore requires more than expanding the availability of clinical interventions; it also requires ensuring that women and children can reach and use services when they need them.

The shortage and uneven distribution of qualified health personnel compound these challenges. For families living far from health facilities, the costs of transportation, lost income, and repeated visits may delay antenatal attendance, skilled delivery care, postnatal assessment, and treatment of childhood illness. Facility based approaches remain indispensable, particularly for obstetric emergencies and severely ill children, but cannot on their own address the household and community factors that shape decisions about seeking care. Community health workers (CHWs) have consequently become an important part of efforts to extend primary health care beyond clinical settings.

CHWs undertake diverse responsibilities, including health education, antenatal counselling, breastfeeding support, recognition of danger signs, childhood illness assessment, and referral to appropriate services. Their familiarity with local languages and social conditions may help build trust and connect underserved households with formal care. Evidence suggests that some CHW interventions improve breastfeeding practices and childhood immunization, although findings for morbidity and mortality are less consistent. (Lewin et al., 2010) These results support the contribution of community based care while also exposing the limits of treating CHWs as a single, uniform intervention.

In practice, programmes vary considerably in recruitment, training, supervision, compensation, assigned tasks, and relationships with health facilities. A worker providing preventive counselling within a supported referral network operates under different conditions from one expected to manage childhood illness without dependable supplies or clinical support. Differences in study design, outcome measurement, and observation periods further complicate interpretation. For example, evidence on the community management of childhood wasting remains uncertain, despite growing interest in expanding such responsibilities. (Papadopoulou et al., 2023) Increased contact with services should therefore not be assumed to produce equivalent improvements in health outcomes.

This review critically examines the effectiveness of CHW interventions across maternal, newborn, and child health, the mechanisms through which benefits may arise, and the contextual and methodological factors that explain divergent findings. It further considers equity, workforce support, and sustainability, asking under what conditions these programmes improve health, why their results differ, and what is needed to maintain their benefits at scale.

2. Community Health Worker Models and Intervention Approaches

2.1. Roles and Evolution of CHWs in Maternal and Child Health

Community health workers (CHWs) occupy a diverse position between households and formal health services. Earlier programmes frequently emphasized health promotion and basic preventive tasks, whereas contemporary initiatives may involve CHWs throughout pregnancy, the postnatal period, and early childhood. (Perry et al., 2014) Their responsibilities can include identifying pregnant women, encouraging antenatal attendance, discussing birth preparedness, supporting breastfeeding, monitoring child growth, promoting immunization, and recognizing danger signs that require clinical assessment. These functions do not replace the responsibilities of midwives, nurses, or physicians. Rather, CHWs can provide repeated household contact, communicate in familiar languages, and help families overcome practical barriers to care.

Yet the CHW workforce is far from uniform. Some workers receive regular salaries and operate within primary care teams, while others are volunteers or depend on intermittent incentives. Education, training, supervision, clinical authorization, and accountability arrangements vary widely. As a result, the designation CHW identifies a broad workforce category, not a standardized intervention with predictable capabilities. (Olaniran et al., 2017)

2.2. Major Public Health Intervention Models

Intervention models differ in how they reach families and what they seek to change. Home visits allow CHWs to provide tailored counselling, recognize emerging problems, and follow up after delivery or referral. Community mobilization, including facilitated women's groups, aims to strengthen collective awareness and responses to maternal and newborn health risks. Health education programmes typically target particular behaviours, whereas integrated community case management enables appropriately trained workers to assess and treat selected childhood illnesses according to defined protocols. (Young et al., 2012) Referral support connects recognition of danger signs with facility assessment. Digital tools can assist with decision support, reminders, records, and communication between CHWs and supervisors.

These approaches cannot be evaluated as if they deliver the same service. A breastfeeding counselling programme and a childhood illness management programme differ in their objectives, expected outcomes, and requirements for clinical support. Even within a particular model, contact frequency, supervision, supplies, transport, and facility readiness influence whether planned activities occur. Digital reporting may improve documentation without resolving shortages of medicines or referral capacity. (Braun et al., 2013) Furthermore, evaluations frequently examine intervention packages that combine CHW activities with changes in facility services, making it difficult to attribute effects to CHWs alone. Comparisons of effectiveness therefore require careful attention to what workers actually deliver, the conditions under which they operate, and the outcomes each programme can reasonably influence.

3. Effectiveness of CHW Interventions Across Maternal and Child Health Outcomes

3.1. Maternal Health Outcomes

Community health worker interventions have produced encouraging but uneven improvements in maternal care. Their clearest effects often concern timely contact with health services rather than maternal morbidity or survival. In a cluster randomized trial in Mali, proactive household visits increased the likelihood of completing at least four antenatal contacts compared with services provided at fixed community posts (risk ratio 1.25), but did not produce a measurable difference in institutional delivery between study arms. (Kayentao et al., 2023) An Ethiopian trial pairing CHWs with faith leaders reported 14% more first antenatal visits, 26% more fourth visits, and 10% more facility deliveries. (Guthrie et al., 2021) These findings support community outreach, although the contributions of other programme components cannot always be separated from those of CHWs.

Evidence on birth preparedness and postpartum care is more complex. In a cluster randomized study in northern Nigeria, household visits involving pregnant women and their spouses were associated with fewer reported pregnancy complications and postpartum infections, despite no significant increase in antenatal attendance, skilled birth attendance, or facility delivery. (Cockcroft et al., 2019) The small number of randomized wards and reliance on reported outcomes warrant caution. Together, these findings suggest that community engagement may influence maternal health through pathways beyond facility utilization, although neither approach guarantees better clinical outcomes.

Family planning effects also depend on existing service access. In Ethiopia, integrating postpartum contraceptive counselling into community contacts increased contraceptive uptake among women who delivered at home, from 27.8% to 35.2%, but offered no detectable additional benefit among women delivering in facilities. (Sitrin et al., 2020) More importantly, a large Pakistani

trial of CHW supported detection, initial management, and referral for preeclampsia found no significant reduction in maternal mortality or its primary composite outcome. (Qureshi et al., 2020) Effective outreach cannot reliably compensate for inadequate obstetric treatment, referral capacity, or continuity of care. Collectively, the evidence supports CHWs as a means of improving access and preparedness while cautioning against equating greater service contact with proven reductions in maternal deaths.

3.2. Newborn Health Outcomes

Community health worker interventions targeting newborn health have demonstrated improvements in essential care practices, although their effects on neonatal survival vary across intervention models. In a cluster randomized trial in rural Bangladesh, a home care programme involving antenatal and postnatal household visits reduced neonatal mortality by 34% during the final six months of implementation, whereas a community mobilization approach produced no significant mortality reduction. (Baqui et al., 2008) This contrast suggests that direct household engagement and early identification of newborn complications may offer advantages over community education alone, although the contribution of individual intervention components remains uncertain.

Evidence from India further demonstrates the potential benefits of comprehensive newborn care. A cluster randomized trial in Shivgarh reported a 54% reduction in neonatal mortality following an intervention combining breastfeeding promotion, thermal care, hygienic practices, and recognition of danger signs. (Kumar et al., 2008) Similarly, a community based field trial in Gadchiroli documented substantial mortality reductions after trained health workers introduced home visits and treatment of neonatal infections. (Bang et al., 1999) However, differences in study design, baseline mortality, and intervention intensity limit direct comparisons and the generalizability of these findings.

Importantly, improvements in care seeking do not necessarily translate into better survival. In Ghana, the Newhints programme increased recognition and referral of sick newborns, with 86% of referred infants reaching health facilities, yet the reduction in neonatal mortality was not statistically significant. (Kirkwood et al., 2013) Some referred infants were unable to obtain appropriate treatment, illustrating how weaknesses in facility readiness can undermine community interventions. Collectively, these findings suggest that CHWs can improve breastfeeding support, early postnatal assessment, recognition of danger signs, and timely referral. However, sustained reductions in neonatal morbidity and mortality depend on adequate training, consistent household coverage, and accessible clinical services capable of responding effectively to identified complications.

3.3. Child Health Outcomes

Community health worker interventions have contributed to improvements in childhood immunization, nutrition counselling, and management of common illnesses, although their effects vary across delivery models and health outcomes. In a randomized trial involving low income communities in Karachi, Pakistan, targeted immunization education delivered by trained CHWs increased completion of the third diphtheria, pertussis, and tetanus vaccine dose from 51.7% to 72.1%. (Owais et al., 2011) This finding demonstrates the potential value of culturally appropriate household education, particularly where limited awareness contributes to incomplete vaccination. However, educational interventions may achieve smaller gains where vaccine shortages, geographical barriers, or weak health services remain unresolved.

Evidence from nutritional interventions presents a more complex picture. The SPRING cluster randomized trials in India and Pakistan evaluated home visits promoting appropriate feeding practices and early childhood development. Although children receiving the intervention were more likely to meet recommended dietary criteria, neither trial demonstrated significant improvements in linear growth or developmental outcomes. (Kirkwood et al., 2023) These findings suggest that counselling and growth monitoring may strengthen nutritional practices and facilitate identification of vulnerable children, but cannot independently overcome food insecurity, inadequate dietary intake, or competing household constraints.

Community based management of childhood illnesses has similarly produced mixed results. In Ethiopia, a cluster randomized evaluation of integrated community case management found that trained health workers provided generally appropriate treatment for pneumonia, diarrhoea, and malaria, yet overall care seeking remained low and childhood mortality declined at comparable rates in intervention and comparison areas. (Amouzou et al., 2016) Limited service utilization therefore weakened the potential population benefit despite reasonable treatment quality.

Taken together, these studies indicate that CHWs can improve preventive behaviours and access to selected childhood services, but effectiveness depends on sustained caregiver engagement, reliable supplies, timely treatment, and functioning referral systems. Improvements in immunization uptake or nutritional practices should not automatically be interpreted as evidence of reduced morbidity or improved child survival.

3.4. Cross-Cutting Interpretation of Effectiveness

Across maternal, newborn, and child health, the evidence suggests that CHW interventions achieve more consistent improvements in service utilization and preventive practices than in morbidity and mortality.

Trials in Mali and Pakistan demonstrated measurable improvements in antenatal attendance and childhood immunization, while newborn interventions in Bangladesh and India reported reductions in neonatal mortality. However, comparable improvements in survival were not consistently observed in Ghana and Ethiopia, despite evidence of improved care seeking, referral, or treatment delivery. These differences indicate that intervention effectiveness cannot be explained solely by the presence of CHWs within communities.

A recurring distinction concerns the relationship between intermediate outcomes and sustained health benefits. Increased antenatal attendance does not necessarily ensure appropriate obstetric management, just as improved recognition of childhood illness cannot guarantee effective treatment when essential medicines or referral services are unavailable. (Kruk et al., 2018) The intensity of household contact, quality of training, baseline disease burden, and capacity of receiving health facilities may therefore influence whether improved service delivery translates into measurable health gains.

Interpretation is further complicated by differences in study design, follow up duration, outcome measurement, and intervention composition. Programmes combining CHW activities with broader health system improvements may demonstrate substantial benefits without establishing the independent contribution of community workers. Consequently, the strongest conclusion is not that CHWs are uniformly effective, but that their contribution depends on the interaction between intervention design, community engagement, and health system capacity. Future evaluations must distinguish improvements in service coverage from demonstrable changes in maternal and child health outcomes. Table 1 summarizes empirical evidence on community health worker interventions across maternal, newborn, and child health, highlighting differences in intervention approaches, reported outcomes, and methodological limitations. The findings illustrate why improvements in service utilization and preventive practices do not consistently translate into measurable reductions in morbidity and mortality.

Table 1: Empirical Evidence on Community Health Worker Interventions Across Maternal, Newborn, and Child Health Outcomes.

Study setting and design	Intervention approach	Principal findings	Critical interpretation and limitations
Maternal health: Mali. Cluster randomized trial	Proactive CHW home visits compared with fixed community health posts	Completion of at least four antenatal visits improved (RR 1.25), with no significant difference in institutional delivery.	Household outreach improved antenatal contact but did not demonstrate additional delivery benefits. Findings reflect a broader package of health system support. (Kayentao et al., 2023)
Maternal health: Ethiopia. Cluster randomized trial	Household counselling delivered by CHWs working with faith leaders	First antenatal visits increased by 14%, fourth visits by 26%, and facility deliveries by 10%.	Community partnerships improved service utilization, but the independent contribution of CHWs cannot be isolated. (Guthrie et al., 2021)
Maternal health: Ethiopia. Quasi experimental evaluation	Integration of postpartum family planning into community health services	Contraceptive uptake among women delivering at home was 35.2% in intervention areas versus 27.8% in comparison areas. No additional benefit was detected among facility deliveries.	Benefits differed according to delivery setting. Other programme and facility factors may have contributed to the observed effects. (Sitrin et al., 2020)
Maternal health: Pakistan. Cluster randomized trial (CLIP)	CHW supported identification, initial management, and referral for preeclampsia	No significant reduction in the primary composite of maternal, fetal, and newborn mortality or major morbidity (adjusted OR 1.20; 95% CI 0.84–1.72).	Community risk identification alone was insufficient to establish improved overall clinical outcomes. (Qureshi et al., 2020)
Newborn health: Bangladesh. Cluster randomized trial	Antenatal and postnatal home care compared with community mobilization and usual services	Home care reduced neonatal mortality by 34% during the final six months of implementation; community mobilization showed no significant mortality benefit.	Intensive household care showed stronger survival benefits, although effects were assessed within a specific implementation period. (Baqui et al., 2008)
Newborn health: India, Shivgarh. Cluster randomized trial	Community engagement and home visits promoting breastfeeding, thermal care, hygiene, and danger sign recognition	Neonatal mortality was 54% lower in the essential newborn care intervention arm than in controls.	Strong survival benefits were observed, but the multicomponent intervention limits attribution to individual activities. (Kumar et al., 2008)
Newborn health: Ghana. Cluster randomized trial (Newhints)	Home visits, newborn danger sign assessment, and referral support	Referral compliance reached 86%; neonatal mortality was 29.8 versus 31.9 deaths per 1,000 live births in intervention and control groups, without a statistically significant difference.	Improved recognition and referral did not establish a survival benefit. Facility treatment barriers remained important. (Kirkwood et al., 2013)
Child health: Pakistan, Karachi. Randomized controlled trial	CHW delivered pictorial immunization education	Completion of three doses of DPT and hepatitis B vaccines reached 72.1% versus 51.7% in controls (adjusted RR 1.39).	Targeted education improved vaccine completion, but the short follow up and localized population limit generalizability. (Owais et al., 2011)
Child health: India and Pakistan. Parallel cluster randomized SPRING trials	Home visits supporting complementary feeding, nutrition, and early childhood development	The proportion meeting minimum acceptable dietary criteria was 35% higher in India and 45% higher in Pakistan, without significant improvements in growth or developmental outcomes.	Better reported feeding practices did not translate into measurable growth or developmental benefits. Implementation constraints may have contributed. (Kirkwood et al., 2023)
Child health: Ethiopia. Cluster randomized trial	Integrated community case management of pneumonia, diarrhoea, and malaria	Trained workers generally provided appropriate care, but care seeking remained low and childhood mortality declined at similar rates in intervention and comparison areas.	Clinical capacity did not translate into population level survival improvements when utilization of community services remained limited. (Amouzou et al., 2016)

Note: CHW, community health worker; CLIP, Community Level Interventions for Preeclampsia; DPT, diphtheria, pertussis, and tetanus; RR, risk ratio; OR, odds ratio. The reported estimates represent different outcomes and study designs and should not be interpreted as directly comparable measures of intervention effectiveness.

4. Mechanisms and Contextual Determinants of Intervention Effectiveness

4.1. Mechanisms Underlying Positive Intervention Outcomes

The effectiveness of community health workers (CHWs) can be understood through their ability to influence how families recognize health needs, make decisions, and access appropriate care. Community trust represents an important mechanism, particularly when workers share familiar languages, cultural practices, and social experiences with the populations they serve. Such relationships may encourage women to discuss pregnancy concerns, accept health advice, and seek assistance earlier. (Glenton et al., 2013) However, trust is not guaranteed by community membership alone, as concerns about confidentiality, competence, and professional credibility may limit acceptance.

Health education and repeated household engagement provide another pathway through which CHWs influence outcomes. Improvements in breastfeeding practices, immunization uptake, and antenatal attendance are consistent with the potential of counselling to strengthen health literacy and encourage preventive behaviours. Nevertheless, many intervention evaluations measure changes in service utilization without directly establishing whether improved knowledge, motivation, or household decision making produced those changes. The independent contribution of each mechanism therefore remains uncertain.

Early identification of health risks and care navigation may also improve maternal and child health. Through regular household contact, CHWs can recognize warning signs, encourage timely referral, and support continuity between community and facility services. Involving spouses and other caregivers may further address household barriers to care seeking. Although these mechanisms are supported by evidence of improved service engagement and selected health outcomes, their relative contributions to reductions in morbidity and mortality remain insufficiently established. Understanding these pathways requires closer examination of how community interactions translate into appropriate clinical care.

4.2. Health System and Contextual Influences

Community health worker performance depends on the capacity of the wider health system to support the tasks assigned to them. Training must equip workers to provide accurate counselling, recognize complications, and act within their competence. Periodic instruction is

insufficient without supervision that includes observation, feedback, and practical problem solving. (Hill et al., 2014) Equally, remuneration and manageable workloads influence whether workers can maintain regular household contact. Programmes that expand responsibilities without adjusting staffing or compensation risk reducing both the quality and frequency of visits.

Reliable supplies and responsive referral services are especially important when interventions involve treatment or recognition of emergencies. (Chandani et al., 2012) Identifying neonatal danger signs offers limited protection if transport is unavailable, a receiving facility lacks essential medicines, or a family faces unaffordable costs. Geographic isolation can intensify these barriers even where CHWs are well trained. Community participation also shapes programme acceptance. Selection processes perceived as fair may strengthen legitimacy, whereas gender norms, restricted household decision making, or distrust of health institutions may discourage timely care seeking. These influences interact, so strengthening a single programme component may be inadequate when other constraints remain.

4.3. Explaining Variation Across Programmes

Variation in outcomes partly reflects the difference between an intervention as designed and the services actually delivered. A programme may prescribe repeated visits, but staff turnover, competing duties, distance, or stock shortages can reduce contact and weaken implementation fidelity. (Kok et al., 2015) Conversely, more intensive supervision and consistent follow up may help workers identify problems earlier. Greater intensity is not necessarily better, however, if workers become overburdened or additional visits do not connect families with effective treatment.

Contextual adaptation creates a further challenge. Tailoring communication to local beliefs and involving family decision makers may improve acceptance, but changing clinical tasks or visit schedules can alter the intervention being evaluated. The contrasting newborn findings reported in Bangladesh and Ghana illustrate the importance of examining intervention content alongside referral and treatment capacity, rather than assuming that household outreach operates identically across settings. Such comparisons cannot independently establish which component caused the differences. Stronger implementation measures, including actual visit completion, referral outcomes, service readiness, and workload, are needed to distinguish ineffective programme design from inadequate delivery. Ultimately, success depends on whether CHW activities address the principal barriers to care within a particular setting.

5. Critical Appraisal of Existing Evidence and Unresolved Controversies

5.1. Methodological Strengths and Limitations

Evidence on community health worker (CHW) interventions spans cluster randomized trials, quasi experimental evaluations, observational studies, and routine programme reports. This diversity provides insight into both effectiveness and implementation, but the findings do not carry equal evidentiary weight. Cluster randomized trials can strengthen causal inference by reducing selection bias, particularly when allocation, baseline characteristics, and outcome assessment are adequately managed. Yet even these studies often evaluate packages combining CHW activities with additional training, supplies, community mobilization, or improvements in facility care. A favourable result therefore does not necessarily isolate the contribution of CHWs from that of the wider intervention.

Nonrandomized evaluations face further difficulties. Communities receiving CHW support may differ from comparison communities in poverty, health infrastructure, local leadership, or prior service use. Inadequate adjustment for these differences can exaggerate or conceal programme effects. Studies relying on caregivers' recollection of antenatal attendance, newborn practices, or childhood illness are vulnerable to recall and social desirability bias. Short follow up periods also favour detection of changes in knowledge and service uptake over less frequent outcomes such as maternal deaths. Meanwhile, inconsistent definitions of home visits, appropriate referral, programme exposure, and quality of care complicate comparisons. Publication bias and selective outcome reporting may further distort conclusions when unsuccessful interventions receive less attention. These limitations are particularly consequential when mortality reductions are inferred from uncontrolled comparisons before and after programme implementation.

5.2. Areas of Consensus, Disagreement, and Uncertainty

There is reasonable agreement that appropriately supported CHWs can extend contact with households and encourage selected preventive practices. (Gilmore & McAuliffe, 2013) Greater uncertainty surrounds the magnitude, consistency, and durability of effects on mortality. Positive newborn survival findings from intensive home care programmes coexist with trials reporting improved referral or care seeking but no statistically significant mortality benefit. Such differences require consideration of baseline mortality, statistical power, intervention content, and the availability of effective treatment after referral. Importantly, a statistically nonsignificant finding does not establish the absence of benefit, particularly when mortality events are uncommon and estimates remain imprecise.

Workforce arrangements remain contested. Salaries may improve retention, accountability, and financial security, but payment alone cannot compensate for weak supervision or excessive workloads. Volunteer models may benefit from established community relationships, yet reliance on unpaid labour raises concerns about continuity and fairness. Similarly, additional training is not necessarily more effective when practical reinforcement and clinical support remain inadequate. Digital decision tools may improve documentation and adherence to treatment protocols, although their added clinical benefits, particularly during large scale implementation, remain uncertain. (Agarwal et al., 2021)

Generalizability requires equal caution. Outcomes from closely supervised trials with reliable supplies may not transfer to underfunded national programmes. Stronger conclusions require evaluations that document intervention components, implementation fidelity, contextual conditions, and patient outcomes together. The essential distinction is between evidence that programmes involving CHWs produce benefits, evidence establishing their independent causal contribution, and claims supported primarily by associations or administrative performance indicators.

6. Health Equity, Sustainability, and Public Health Policy Implications

6.1. CHWs and Equitable Access to Maternal and Child Health Services

Equity should be assessed by who benefits from community health worker (CHW) programmes, not simply by how many households they reach. Home visits and locally delivered counselling can reduce informational and geographical barriers for women who rarely attend facilities, particularly in remote or disadvantaged communities. Yet increased coverage does not necessarily narrow inequalities. (McCollum et al., 2016) Families may still lack money for transport, permission to seek care, or access to facilities capable of providing treatment. A referral that cannot be completed offers little protection to a mother or child facing an urgent complication.

Programme design can also reproduce exclusion. Workers may concentrate visits among accessible households, while mobile populations, adolescent mothers, people with disabilities, and families living in isolated settlements remain underserved. Recruiting workers from the community can improve cultural understanding, but shared residence does not guarantee that marginalized groups are represented or heard. Equity evaluation therefore requires disaggregated measures of contact, completed referrals, care quality, and health outcomes, alongside community accounts of whose needs remain unmet.

6.2. Sustainability and Integration into Health Systems

Sustainability depends on whether CHW services can function beyond short funding cycles and intensive pilot supervision. Reliance on unpaid or poorly compensated labour may lower immediate programme costs while contributing to turnover, inconsistent visits, and inequitable expectations of workers, many of whom are women. (Steege et al., 2018) Fair remuneration, clearly defined responsibilities, manageable caseloads, and opportunities for progression are therefore matters of service quality as well as workforce welfare. Supportive supervision should include practical feedback and problem solving, rather than relying primarily on reporting targets.

Institutional recognition must be matched by operational integration. CHWs need reliable supplies, access to clinical advice, and referral arrangements that clarify responsibility when a patient moves from household assessment to facility treatment. Health facilities, in turn, require mechanisms to communicate referral outcomes so that workers can provide appropriate follow up. (Scott et al., 2018) Scaling programmes without strengthening these connections risks expanding activity while weakening effectiveness. Comparable challenges have been documented in HIV care programmes, where weaknesses in linkage to care, retention, and service coordination undermine continuity and the effectiveness of health interventions (Ayo-Ige et al., 2024). Long term financing should account for training, transport, supervision, commodities, and information systems, not merely the number of workers recruited.

6.3. Implications for Public Health Policy and Programme Design

Public health policy should treat CHW programmes as components of a functioning care pathway rather than

inexpensive substitutes for professional health services. Workforce policies need to define competencies, compensation, supervision, and safe limits of practice, while programme planning should involve communities in identifying barriers and evaluating service acceptability. (Colvin et al., 2021) Referral strengthening may require transport support, clear clinical protocols, feedback from facilities, and accountability for delays that CHWs cannot resolve.

Financing decisions should prioritize sustained performance over rapid geographic expansion. Governments and implementing partners should assess recurrent costs and identify which programme functions can be maintained within health systems. Evidence from broader global health initiatives also emphasizes the importance of international partnerships, sustainable financing, institutional coordination, and local capacity development in maintaining public health interventions (Nwokedi et al., 2025). Evaluation must likewise move beyond counting home visits, counselling sessions, or referrals issued. Useful indicators include the proportion of referrals completed, time to appropriate treatment, continuity of postnatal follow up, quality of care, and maternal and child outcomes, reported separately for disadvantaged groups. No single indicator captures effectiveness; together, these measures can expose whether greater reach translates into timely, appropriate care. The policy objective is not simply to deploy more CHWs, but to create conditions in which their work produces durable and fairly distributed health benefits. Table 2 synthesizes the principal health system, workforce, and community factors influencing the effectiveness, equity, and sustainability of community health worker interventions. It highlights how these factors may facilitate or constrain programme outcomes and identifies corresponding priorities for public health policy and implementation.

Table 2: Determinants of Community Health Worker Intervention Effectiveness, Equity, and Sustainability.

Key determinant	Influence on intervention effectiveness	Equity and sustainability implications	Policy and programme implications
Training and clinical competence	Appropriate training supports accurate health education, recognition of danger signs, and delivery of services within defined competencies.	Uneven training quality may contribute to differences in service quality across communities.	Establish competency standards, refresher training, and practical skills assessments. (Kok et al., 2015)
Supportive supervision	Regular supervision facilitates feedback, problem solving, adherence to protocols, and consistent service delivery.	Inadequate supervision may weaken programme performance, particularly in remote settings.	Integrate structured supervision, mentorship, and performance feedback into routine services. (Hill et al., 2014)
Remuneration and workload	Fair compensation and manageable caseloads may improve motivation, retention, and continuity of household visits.	Dependence on unpaid labour can threaten workforce stability and create inequitable employment conditions.	Provide predictable remuneration, realistic workloads, and opportunities for professional development. (Colvin et al., 2021)
Medical supplies and logistical support	Reliable commodities and equipment enable CHWs to perform assigned preventive	Stock shortages may disproportionately affect underserved communities and	Strengthen procurement, supply distribution, inventory monitoring, and logistical

	and treatment activities.	interrupt essential services.	support. (Chandani et al., 2012)
Referral infrastructure	Functional referral systems connect community identification of health risks with timely clinical assessment and treatment.	Transport costs, poor communication, and referral delays may prevent disadvantaged families from receiving appropriate care.	Establish referral protocols, transport arrangements, communication systems, and referral completion monitoring. (Scott et al., 2018)
Health facility readiness	Adequate staffing, medicines, equipment, and clinical capacity determine whether referrals result in effective treatment.	Weak facilities may undermine CHW benefits despite improvements in household engagement and care seeking.	Coordinate CHW expansion with investments in primary care and emergency maternal and child health services. (Kruk et al., 2018)
Community participation and cultural acceptability	Trust, community involvement, and culturally appropriate communication can strengthen programme acceptance and household engagement.	Exclusion from programme decisions may reduce participation among socially marginalized populations.	Involve diverse community representatives in programme design, implementation, and evaluation. (Glenton et al., 2013)
Geographical and socioeconomic conditions	Distance, poverty, transport barriers, and household decision making influence service access and intervention uptake.	Uniform service delivery models may leave remote and disadvantaged households underserved.	Adapt outreach intensity and resource allocation to local needs and geographical barriers. (McCollum et al., 2016)
Financing and institutional integration	Stable financing and defined responsibilities support workforce continuity, coordination, and consistent programme delivery.	Short funding cycles and fragmented governance can threaten long term service availability.	Integrate CHWs into primary health care planning, workforce policies, and sustainable financing arrangements. (Cometto et al., 2018)
Monitoring, accountability, and digital support	Routine data and appropriate digital tools can support follow up, documentation, and identification of implementation problems.	Unequal digital access, weak data systems, and limited accountability may reinforce existing service disparities.	Monitor referral completion, quality of care, health outcomes, and equity using reliable and context appropriate indicators. (Braun et al., 2013)

Note: CHW, community health worker. The determinants and proposed policy responses represent a critical synthesis of workforce, community, and health system considerations. Their effects may differ across programme models and implementation contexts

7. An Integrated Framework and Future Research Priorities

7.1. Proposed Community-to-Outcome Pathway Framework

The evidence reviewed suggests that community health worker (CHW) effectiveness should be understood as a sequence of linked but contingent processes rather than as a direct consequence of deploying workers in underserved communities. The proposed Community-to-Outcome Pathway Framework brings together five interacting dimensions: programme and health system capacity, community engagement and delivery mechanisms, service access and quality, maternal and child health outcomes, and equity and sustained impact. Its purpose is to clarify where benefits may arise, where they may be lost, and which relationships require further investigation. It is an interpretive model derived from the

themes considered in this review, not a validated causal framework.

Programme capacity provides the operational foundation. Training, supervision, reasonable remuneration, manageable workloads, and facility readiness influence whether CHWs can deliver appropriate services consistently. These inputs shape community engagement through household visits, culturally responsive education, trust, practical support, and referral assistance. Engagement may then improve access by increasing timely use of services and continuity of care. However, a referral represents a potential connection to treatment, not treatment itself. If transport is unavailable, medicines are lacking, or facilities cannot manage complications, improvements in contact and care seeking may have little effect on morbidity or mortality.

The framework therefore distinguishes delivery mechanisms from care pathway performance and ultimately from health outcomes. This distinction helps explain why programmes can increase antenatal visits or immunization uptake without producing detectable mortality reductions. It also discourages attributing

improvements from broad intervention packages solely to CHWs. Equity operates both as a condition influencing each pathway and as an outcome requiring independent assessment. Poverty, geography, gender relations, disability, and social exclusion can determine who receives visits, who completes referrals, and who benefits from treatment. A programme that raises average coverage while leaving the least accessible households behind cannot be assumed to improve equity.

Finally, the framework incorporates feedback from household experiences, referral completion, clinical outcomes, and workforce performance into programme

adaptation. Feedback should inform adjustments to visit schedules, supervision, referral arrangements, and resource allocation. These relationships are likely to change across settings and over time. Their inclusion makes the framework a guide for identifying testable explanations of success and failure, rather than a claim that all five dimensions operate in a fixed sequence. The proposed Community-to-Outcome Pathway Framework is illustrated in Figure 1, highlighting the relationships between programme capacity, community engagement, service delivery, health outcomes, and equity within different implementation contexts.

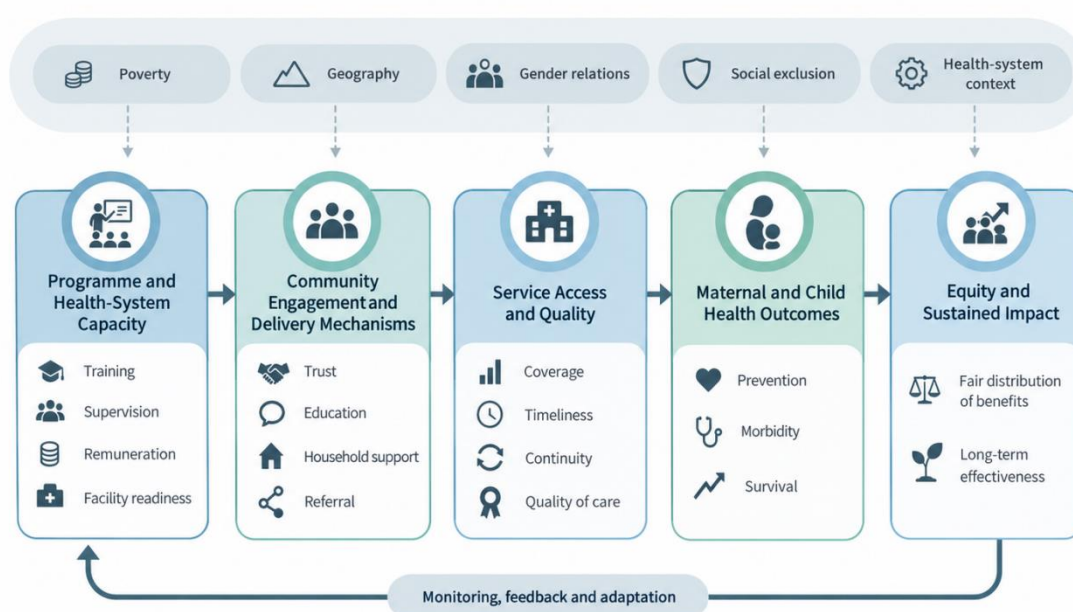


Figure 1: Community-to-Outcome Pathway Framework for Community Health Worker Interventions.

The framework illustrates five interconnected dimensions influencing the effectiveness and sustainability of community health worker interventions: programme and health system capacity, community engagement and delivery mechanisms, service access and quality, maternal and child health outcomes, and equity and sustained impact. Contextual factors, including poverty, geography, gender relations, social exclusion, and health system conditions, may influence these relationships. The feedback pathway represents continuous monitoring, evaluation, and programme adaptation. The framework provides an interpretive synthesis of potential pathways rather than a validated causal model.

7.2. Future Research Priorities

Research should first establish which components of CHW programmes contribute to meaningful health outcomes. Cluster randomized and carefully designed quasi experimental studies can compare intervention packages or variations in supervision, visit frequency, and referral support, while documenting what participants actually received. Longer follow up is needed to determine whether early improvements in service uptake persist and affect maternal morbidity, child illness, and survival. Studies should report uncertainty around effect estimates and avoid treating statistically nonsignificant mortality findings as proof of no benefit.

A second priority is mechanism focused evaluation. Longitudinal and mixed methods studies could examine

whether trust, health literacy, household decision making, and successful care navigation mediate improvements in access and treatment. Implementation studies should measure fidelity, workload, stock availability, referral completion, and facility response, allowing investigators to separate failures of design from failures of delivery. Future evaluations could also explore adaptive, data-driven modelling to identify service delivery gaps, anticipate resource constraints, and support context-sensitive programme planning, drawing on broader recommendations for participatory and responsive public health modelling (Lawal et al., 2025).

Equity and sustainability also require stronger evidence. Evaluations should report outcomes by socioeconomic position, location, age, and other relevant dimensions of disadvantage, while engaging marginalized communities in defining acceptable services. Comparative economic analyses should include remuneration, supervision, transport, supplies, and the costs borne by families, rather than counting worker contacts alone. Finally, digital decision support and reporting systems should be assessed for their incremental benefits, usability, privacy implications, and dependence on reliable infrastructure. Comparative research suggests that retrieval-augmented generation can improve the accuracy and contextual relevance of large language model-based question-answering systems (Balogun et al., 2026). However, the clinical safety, effectiveness, and practical applicability of such approaches in community health worker programmes require further evaluation.

The most useful research will identify not merely whether CHWs are effective, but which combinations of workforce support, community engagement, and clinical capacity deliver lasting benefits for those at greatest risk.

8. CONCLUSION

Community health workers have demonstrated considerable potential to improve maternal and child health by extending preventive services, strengthening household engagement, and facilitating timely access to care. Evidence is particularly encouraging for antenatal attendance, immunization uptake, essential newborn care, and selected childhood illness interventions. However, improvements in service coverage and care seeking do not consistently translate into reductions in morbidity or mortality. These differences underscore the importance of distinguishing programme activity from measurable health benefits.

The effectiveness of CHW interventions depends on more than individual worker competence. Training, supportive supervision, adequate remuneration, reliable supplies, functional referral systems, and responsive health facilities collectively determine whether community engagement leads to appropriate care. Equally important is ensuring that programmes reach populations facing the greatest barriers rather than reinforcing existing inequalities. The proposed

Community-to-Outcome Pathway Framework integrates these considerations by linking programme capacity, delivery mechanisms, service quality, health outcomes, and equity within an adaptive system.

Future policy should prioritize institutional integration, sustainable financing, and accountability for meaningful health outcomes. The long term value of CHW programmes will ultimately depend not on how extensively they are deployed, but on whether they consistently deliver effective, equitable, and sustainable improvements in maternal and child health.

Declarations

Ethics Approval and Consent to Participate

Not applicable. This article is a narrative review based on previously published literature and does not involve primary data collection or direct participation of human subjects.

Consent for Publication

Not applicable.

Availability of Data and Materials

No new datasets were generated or analyzed for this review. The evidence discussed is drawn from previously published literature.

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Competing Interests

The authors declare no competing interests.

Author Contributions

All authors contributed to the conceptualization, development, critical revision, and final approval of the manuscript.

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Generative artificial intelligence tools were used to assist in manuscript drafting and language refinement. The authors retain responsibility for the scientific content, interpretation, accuracy of references, and final manuscript.

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