



REVIEW ARTICLE

COMMUNITY BASED HIV PREVENTION FOR CHILDREN IN RESOURCE-LIMITED SETTINGS: CLINICALLY RELEVANT STRATEGIES FOR IMPROVING PEDIATRIC OUTCOMES

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Abstract

HIV continues to impose a disproportionate burden on children in resource-limited settings, where socioeconomic constraints, fragile health systems, and limited access to prevention services impede progress toward global elimination goals. Community-based HIV prevention models have emerged as critical approaches to address structural and behavioral vulnerabilities, reduce pediatric HIV incidence, and strengthen linkages to care. This narrative review synthesizes current evidence on community-led, family-centered, and health system supported interventions that have demonstrated effectiveness in preventing HIV acquisition among children. Key approaches include early maternal HIV diagnosis, prevention of mother-to-child transmission (PMTCT), community health worker (CHW) programs, school- and faith-based initiatives, social protection strategies, and innovations in community testing and digital health. Although notable progress has been made, gaps persist in coverage, sustainability, multi sector collaboration, and adaptation to humanitarian settings. Strengthening community ownership, leveraging local capacity, and integrating child-focused HIV prevention with broader social welfare programs are essential to achieving equitable outcomes.

Keywords: Children, community health workers, community HIV prevention, PMTCT, resource-limited settings.

INTRODUCTION

Children in resource-limited settings continue to shoulder a disproportionate share of the global HIV burden despite ongoing advancements in antiretroviral therapy (ART), widespread awareness campaigns, and significant international investments in HIV prevention. Sub-Saharan Africa accounts for the majority of new pediatric infections, driven by persistent gaps in maternal HIV testing, inconsistent retention in prevention of mother-to-child transmission (PMTCT) programs, late antenatal presentation, and limited access to early infant diagnosis^{1,2}. In many rural and peri-urban regions, structural barriers including poverty, transportation challenges, overcrowded health facilities, and shortages of skilled healthcare providers significantly constrain the ability of families to engage with facility-based prevention programs. As a result, children remain vulnerable not only to vertical transmission but also to secondary exposures associated with orphanhood, limited supervision,

sexual exploitation, and weakened social support systems^{3,4}. The epidemiology of pediatric HIV in underserved settings is shaped by a complex interplay of social determinants, gender inequities, cultural practices, and systemic resource limitations. Maternal HIV status, breastfeeding practices, household economic stability, and caregiver health literacy strongly influence a child's risk profile. At the same time, stigma and discrimination deeply embedded in many communities continue to undermine HIV testing uptake, disclosure, adherence to ART, and long-term follow-up. Facility-based programs alone have proven insufficient in addressing these multi-layered determinants, prompting a strategic shift toward community-centered approaches that bring services closer to families and leverage trusted local structures^{5,6}.

Community-based HIV prevention strategies have emerged as critical components of child-focused health systems strengthening, with evidence increasingly demonstrating their effectiveness in improving access, acceptability, and continuity of care. These strategies

encompass diverse models such as community health worker (CHW) outreach, home-based HIV testing, peer-led PMTCT support groups, school- and faith-driven awareness activities, social protection interventions, and community-focused innovations in digital health. Their core advantage lies in their ability to meet families where they are culturally, geographically, and socioeconomically while integrating HIV prevention into the daily realities of community life^{7,8}. Furthermore, community engagement fosters shared responsibility, enhances trust in the healthcare system, and mitigates stigma by normalizing HIV prevention activities within household and community settings. For example, CHWs, peer mothers, and lay counselors often have intimate knowledge of local norms and can tailor messages in ways that resonate with caregivers and adolescents. School-based programs offer structured platforms for delivering age-appropriate HIV and sexual health education, while social protection initiatives address underlying vulnerabilities such as malnutrition and economic instability, which influence long-term outcomes for children^{9,10}. The aim of this narrative review is to synthesize evidence on community-based HIV prevention strategies for children in resource-limited settings and to evaluate their clinical relevance, implementation effectiveness, and impact on improving pediatric health outcomes.

METHODS

This narrative review employed a structured, integrative approach to identify and synthesize evidence on community-based HIV prevention strategies relevant to pediatric populations in resource-limited settings. A comprehensive search was conducted across PubMed, Scopus, Web of Science, and Google Scholar for literature published between 2005 and 2025. Search terms included combinations of “community-based HIV prevention,” “pediatric HIV,” “PMTCT,” “resource-limited settings,” “community health workers,” and “early infant diagnosis.”

Eligible sources included peer-reviewed articles, systematic reviews, implementation studies, program evaluations, and global health reports from WHO, UNICEF, and UNAIDS. Studies were included if they addressed community-level interventions targeting children or caregivers and demonstrated clinical relevance or measurable outcomes. Non-English articles, conference abstracts without full data, and studies focused solely on adult populations were excluded. Findings were organized thematically to highlight strategies with direct implications for improving pediatric HIV prevention and care in resource-constrained settings.

Community Health Worker (CHW) models in pediatric HIV prevention

Community Health Workers (CHWs) have become indispensable actors in the delivery of pediatric HIV prevention services in resource-limited settings, where shortages of skilled health professionals and barriers to facility-based care remain persistent. CHWs serve as trusted liaisons between the formal health sector and

the community, often originating from the same cultural and social backgrounds as the families they support. Their proximity to households enables them to identify vulnerable children early, facilitate maternal HIV testing, and promote engagement with prevention of mother-to-child transmission (PMTCT) services. This frontline presence is particularly critical in rural and hard-to-reach communities, where transportation challenges and limited clinic infrastructure impede timely access to antenatal care and HIV prevention programs^{11,12}. One of the most significant contributions of CHWs is their role in bridging gaps along the maternal-child HIV continuum of care. Through home visits, CHWs provide counseling on safer pregnancy and breastfeeding practices, guide mothers on adherence to antiretroviral therapy (ART), and reinforce the importance of early infant diagnosis. Their routine follow-ups have been shown to reduce loss to follow-up during pregnancy, delivery, and postpartum periods. Furthermore, they play a pivotal role in male partner mobilization an important predictor of PMTCT success by encouraging couples' HIV testing and supporting joint decision-making around maternal and infant health^{13,14}.

CHWs also contribute to pediatric HIV prevention by extending services beyond the clinical model into community life. They mobilize community testing campaigns, facilitate the distribution of HIV self-test kits to caregivers, and link families to community ART refill points. In many high-burden regions, CHWs oversee mother support groups, where peer-to-peer learning strengthens health literacy, reduces stigma, and enhances psychosocial resilience among women living with HIV. Importantly, CHWs are often the first to detect social vulnerabilities that increase a child's risk of HIV exposure, such as food insecurity, domestic violence, caregiver illness, or school dropout. By coordinating referrals to social protection services and local support networks, they address structural factors that shape long-term outcomes^{15,16}. The effectiveness of CHW-led interventions in preventing pediatric HIV is supported by consistent evidence demonstrating improvements in maternal HIV testing uptake, enhanced retention in PMTCT programs, increased adherence to ART, and better early infant diagnosis coverage. Their culturally attuned communication strategies help counteract stigma and misinformation, fostering trust and acceptance among caregivers. Additionally, CHWs strengthen continuity of care by ensuring that children affected or exposed to HIV remain engaged in longitudinal follow-up, even when caregivers face socioeconomic or geographic barriers to clinic attendance (Table 1)^{17,18}.

Prevention of Mother-to-Child Transmission (PMTCT) through community platforms

The prevention of mother-to-child transmission (PMTCT) of HIV remains the most decisive strategy for reducing pediatric HIV incidence, particularly in resource-limited settings where a large proportion of women present late for antenatal care or do not access facility-based services consistently. Community platforms have become vital extensions of PMTCT programs by addressing structural, social, and

behavioral barriers that hinder effective uptake and retention across the maternal–child HIV continuum. These platforms promote early diagnosis of maternal HIV infection, facilitate linkage to antiretroviral therapy (ART), reinforce adherence practices, and support infant follow-up during breastfeeding periods that remain critical for preventing vertical transmission^{19,20}. A primary strength of community-based PMTCT interventions lies in their ability to reach pregnant women who might not attend health facilities due to geographic constraints, economic barriers, fear of stigma, or limited health literacy.

Home-based HIV testing campaigns, often led by community health workers (CHWs), have significantly increased the early identification of HIV-positive pregnant women by providing confidential and convenient testing options. Early detection allows rapid initiation of ART, which is essential for viral suppression and reducing the risk of in utero, intrapartum, and postpartum transmission. Community testing strategies also help identify serodiscordant couples, enabling targeted counseling and prevention measures²¹. Male partner engagement is another critical dimension enhanced through community platforms.

Table 1: Community Health Worker (CHW) models in pediatric HIV prevention.

CHW Model	Core Functions	Target Population	Clinical relevance to pediatric HIV prevention	Key outcomes reported in resource-limited settings
Home-Based HIV Testing and Counselling	Household HIV education, caregiver counselling, test distribution, linkage to care	Children and caregivers	Facilitates early diagnosis and timely ART initiation	Increased pediatric case detection and reduced delays in treatment initiation
PMTCT Support and Maternal Follow-Up	Maternal ART adherence support, appointment reminders, male partner engagement	Pregnant and breastfeeding women	Improves maternal viral suppression, reducing MTCT risk	Higher PMTCT retention and increased infant HIV-free survival
EID Outreach and Sample Transport	Dried blood spot (DBS) collection, sample transport, result dissemination	HIV-exposed infants	Accelerates early infant diagnosis and reduces missed testing windows	Faster result turnaround and earlier ART initiation
Adherence Monitoring and Family Support	Home visits, treatment adherence checks, symptom monitoring, caregiver education	HIV-exposed and infected children	Strengthens adherence, reduces morbidity, and supports viral suppression	Improved ART adherence and reduced loss to follow-up
Integrated Community Health Campaigns	Incorporation of HIV messaging in immunization, nutrition, and school programs	Infants, children, adolescents	Broadens prevention reach beyond facilities	Increased service uptake and improved linkage-to-care

In many high-burden settings, male involvement in reproductive health remains limited due to cultural norms, time constraints, or misconceptions about HIV services. Community outreach sessions, couple-focused education, and peer-led mobilization can encourage male HIV testing, disclosure, and co-adherence support. Evidence consistently shows that when male partners are involved, maternal ART uptake improves, retention in antenatal and postpartum care strengthens, and infant outcomes are more favorable²². Peer support models form a cornerstone of community-led PMTCT. Mentor mothers women living with HIV who have successfully completed PMTCT programs provide counseling, psychosocial support, stigma reduction guidance, and practical advice on ART adherence, safe infant feeding, and navigating health systems. These peers serve as relatable role models, particularly for newly diagnosed pregnant women, and their involvement has been associated with reduced loss to follow-up and improved maternal mental health. Support groups also create safe spaces for discussing fears related to disclosure, social isolation, or challenges with breastfeeding practices²³. Community ART distribution and differentiated service delivery models enhance PMTCT effectiveness by reducing the burden of frequent clinic visits. Mobile ART refill points, community drug pick-up centers,

and appointment spacing strategies enable mothers to maintain viral suppression with minimal disruption to daily responsibilities. Such models are especially valuable in rural areas where long travel distances and transport costs hinder adherence. Concurrently, community-based early infant diagnosis (EID) initiatives including dried blood spot collection at home or community hubs reduce delays in identifying HIV-exposed infants who require prophylaxis or early ART initiation^{24,25}. Beyond direct medical interventions, community platforms address the social determinants that shape PMTCT outcomes. Household poverty, food insecurity, gender-based violence, and limited decision-making autonomy profoundly influence a mother's ability to adhere to PMTCT recommendations. Community support structures such as women's groups, microfinance initiatives, and social protection programs have demonstrated indirect yet powerful effects by enhancing maternal empowerment, improving nutritional stability, and fostering supportive environments for ART adherence and safe infant feeding (Table 2)²⁶.

School and faith-based prevention initiatives

Schools and faith-based institutions represent two of the most influential social structures in many resource-limited settings, making them critical platforms for pediatric HIV prevention.

Table 2: Prevention of Mother-to-Child Transmission (PMTCT) through community platforms.

Community Platform	Key Activities/Interventions	Target Population	Clinical Relevance	Reported outcomes in resource-limited settings
Peer Support Groups	Maternal ART adherence counseling, experience sharing, adherence monitoring	Pregnant and breastfeeding women	Improves maternal retention in care and viral suppression	Increased PMTCT uptake; reduced mother-to-child transmission rates
Community Health Worker Home Visits	Early identification of pregnant women, ART reminders, adherence support, family engagement	Pregnant women, infants	Reduces missed appointments and improves early linkage to care	Higher maternal ART adherence; improved infant HIV-free survival
Faith-Based Organization Programs	Health education, stigma reduction, male partner involvement, community mobilization	Pregnant women and families	Encourages disclosure and treatment adherence	Enhanced PMTCT participation; improved maternal viral suppression
Community Gatherings & Local Events	Group education sessions, distribution of educational materials, promotion of facility attendance	Pregnant women and caregivers	Raises awareness, addresses sociocultural barriers	Improved maternal engagement; increased early antenatal registration
Mobile Health (mHealth) Platforms	SMS reminders, appointment tracking, adherence tips	Pregnant and breastfeeding women	Enhances continuous ART adherence and early infant follow-up	Reduced missed visits; timely infant HIV testing and ART initiation

Their deep integration into community life enables them to shape knowledge, behaviors, and social norms from early childhood through adolescence. Given that many children may have limited access to formal health education especially in rural or underserved regions school and faith-based initiatives serve as accessible, culturally acceptable avenues for delivering HIV prevention messages, supporting orphaned and vulnerable children, and addressing stigma before it becomes entrenched²⁷. Schools offer structured, routine access to children and adolescents, allow for the integration of health information into existing curricula. Age-appropriate HIV education, delivered through science, life-skills, or health classes, equips students with foundational knowledge about transmission, prevention, and healthy behaviors as they grow. Evidence shows that school-based HIV programs improve health literacy, delay sexual debut, encourage safer behaviors, and reduce misconceptions that drive stigma. Beyond curriculum-based learning, schools often facilitate co-curricular activities including health clubs, drama groups, and peer-led sessions that reinforce HIV awareness through interactive, youth-friendly modalities. Teachers trained as health promoters play multifaceted roles, serving not only as educators but also as trusted adults who can identify early signs of vulnerability such as frequent absenteeism, neglect, or psychosocial distress among learners affected by HIV²⁸.

In addition to education, schools also function as protective environments. They provide routine, structure, and supportive relationships that reduce exposure to risks associated with unstructured time, including exploitation, trafficking, or transactional sex factors that elevate HIV vulnerability. Many school-based HIV prevention programs integrate broader social protection elements such as nutritional support, gender-based violence prevention training, menstrual health programs, and psychosocial support services. These interventions complement HIV-specific

activities by addressing structural vulnerabilities that influence long-term outcomes for children and adolescents²⁹. Faith-based organizations (FBOs) occupy equally significant roles in HIV prevention, often commanding strong moral authority, community trust, and social influence. In many low-income settings, religious institutions serve as essential social safety nets, operating orphanages, child-support programs, and counseling services. Their involvement in HIV prevention is particularly impactful in tackling stigma one of the most persistent barriers to HIV testing, disclosure, and care-seeking among families. When religious leaders advocate for HIV awareness, promote acceptance, and endorse testing, community attitudes often shift, leading to greater openness and increased uptake of prevention services³⁰.

FBOs also integrate HIV information into sermons, youth fellowship meetings, and family counseling sessions, offering culturally anchored messages that resonate deeply with caregivers and adolescents. Faith leaders are uniquely positioned to influence norms around gender equality, sexual responsibility, and care for vulnerable children. Many FBOs run youth mentorship programs, parent-child communication workshops, and support groups for individuals living with HIV, all of which reinforce prevention knowledge and provide psychosocial stability. Furthermore, collaborations between FBOs and health facilities such as church-based HIV testing days, mobile clinics, and community ART distribution initiatives extend the reach of prevention services to families that might not otherwise engage with formal healthcare systems³¹.

Social protection and structural interventions

Social protection and structural interventions have become central pillars in pediatric HIV prevention strategies, especially in resource-limited settings where poverty, food insecurity, gender inequity, and weak social systems interact to heighten children's vulnerability to HIV exposure. While biomedical interventions remain essential, the socio-economic

environment in which families live often determines whether those interventions are accessed, adhered to, and sustained. Social protection programs aim to reduce these upstream drivers of vulnerability by providing economic stability, improving caregiver capacity, strengthening family cohesion, and reducing the pressures that predispose both children and adolescents to HIV risk³². Evidence from multiple low-income settings indicates that cash transfers improve household food security, school attendance, and child well-being. These improvements, in turn, reduce structural vulnerabilities such as early marriage, child labor, sexual exploitation, and transactional sex factors strongly linked to increased HIV risk among older children and adolescents. Cash transfers also empower caregivers, enabling them to prioritize antenatal visits, adhere to antiretroviral therapy (ART), afford transportation to health facilities, and provide adequate nutrition for themselves and their infants during the breastfeeding period key determinants of PMTCT success³³.

Nutritional support interventions further strengthen pediatric HIV prevention by improving maternal health, reducing immunologic vulnerability, and supporting optimal infant growth. Malnutrition undermines ART effectiveness, complicates maternal treatment adherence, and increases susceptibility to opportunistic infections. By supplying nutritious food packages, fortified supplements, or community kitchens, social protection initiatives reduce the risk of treatment interruptions and contribute to healthier pregnancy and breastfeeding outcomes, thereby lowering the likelihood of mother-to-child transmission³⁴. Parenting-skills training and psychosocial support programs constitute another vital dimension of structural interventions. Caregivers grappling with economic hardship, stigma, depression, or intimate partner violence often find it difficult to maintain consistent engagement with PMTCT and child health services. Parenting programs equip caregivers with the skills to manage stress, communicate effectively with children, and create safer, more nurturing environments. These interventions have been shown to reduce violence within households, improve caregiver mental health, and strengthen protective factors that mitigate risk behaviors as children approach adolescence³⁵.

Structural interventions further encompass gender empowerment initiatives, which address power imbalances that shape maternal decision-making autonomy and influence a woman's ability to seek HIV testing, initiate ART, or adhere to PMTCT protocols. Programs such as women's savings groups, micro-finance initiatives, community dialogues on gender norms, and legal aid services for survivors of gender-based violence help dismantle entrenched inequalities and create environments more conducive to sustained HIV prevention. Empowered women are more likely to engage with antenatal care, disclose their HIV status to partners, and maintain viral suppression critical steps in safeguarding infants from HIV acquisition³⁶. In addition, child protection systems including community child-care committees, case management

services, and local guardianship frameworks play a key role in supporting children who have lost caregivers to HIV or who live in unstable households. These systems facilitate access to healthcare, ensure school retention, prevent exploitation, and provide emotional stability. By reducing social isolation and safeguarding vulnerable children, child protection platforms contribute indirectly yet significantly to HIV prevention efforts.

Innovations in community HIV testing, treatment delivery, and digital health

Innovations in community-based HIV testing, treatment delivery and digital health have significantly expanded the reach and effectiveness of pediatric HIV prevention in resource-limited settings. These innovations respond directly to longstanding barriers including limited facility access, shortages of trained healthcare personnel, transportation constraints, and pervasive stigma that impede early diagnosis, consistent maternal antiretroviral therapy (ART), and infant follow-up. By decentralizing services and leveraging technology, community-driven innovations have emerged as powerful tools for improving maternal engagement, enhancing early infant diagnosis, and strengthening continuity of care across the maternal-child HIV prevention continuum³⁷. Advancements in community HIV testing strategies have markedly improved early detection of HIV among pregnant women and caregivers. Mobile HIV testing units, community wellness days, index testing, and door-to-door home-based testing campaigns have increased the proportion of women diagnosed early in pregnancy an essential prerequisite for effective prevention of mother-to-child transmission (PMTCT). HIV self-testing (HIVST), distributed through community health workers (CHWs), pharmacies, and peer networks, has further broadened accessibility by offering discreet, flexible, and stigma-sensitive testing options. These approaches not only facilitate early maternal diagnosis but also support partner testing, which is instrumental in achieving household-level prevention outcomes³⁸⁻⁴⁰.

Innovations in community-based treatment delivery have transformed how mothers and children living with or exposed to HIV access and maintain ART. Community ART groups offer both logistical convenience and psychosocial support, as members collectively manage drug pickups and share lived experiences. For many women in rural settings, having ART delivered closer to home mitigates transportation costs, time burdens, and privacy concerns. Mobile clinics and outreach teams extend these benefits by offering point-of-care viral load testing, clinical assessments, and infant follow-up services in remote areas. These models have demonstrated measurable improvements in maternal viral suppression rates, which directly correlate with reduced vertical transmission risk^{41,42}. Early infant diagnosis (EID) has also benefited from innovative community-based mechanisms. Point-of-care EID technologies some implemented within community hubs deliver rapid results, allowing for timely ART initiation in infected infants. Additionally, SMS-based notification systems enable caregivers to receive EID results promptly,

minimizing delays associated with clinic bottlenecks^{43,44}. Digital health innovations have become increasingly integral to community-based HIV prevention efforts. Mobile phone-based platforms support a range of interventions, from appointment reminders and adherence support to remote counseling and educational messaging. SMS reminders have been shown to improve adherence to maternal ART, enhance attendance at antenatal and postnatal visits, and strengthen retention in PMTCT programs.

Smartphone applications, where feasible, provide interactive health education, symptom reporting tools, and real-time communication with CHWs. Digital adherence technologies including electronic pillboxes and mobile adherence tracking offer additional layers of support, particularly for high-risk mothers and adolescents⁴⁵. Community digital hubs, powered by solar energy in some settings, create shared spaces for health education sessions, virtual support groups, and telehealth consultations, bridging gaps created by limited healthcare workforce capacity^{46,47}.

CONCLUSIONS

Community-based HIV prevention strategies have become indispensable components of global and national efforts to reduce pediatric HIV incidence in resource-limited settings. By extending prevention, testing, and treatment services beyond the confines of formal health facilities, these community-driven models address the structural, social, and behavioral factors that shape vulnerability among mothers, children, and adolescents. Evidence consistently demonstrates that interventions grounded in community health worker engagement, peer-led PMTCT support, school- and faith-based initiatives, and social protection programs enhance uptake of maternal HIV testing, improve ART adherence, and strengthen early infant diagnosis and follow-up. Innovations in community HIV testing modalities, decentralized treatment delivery, and digital health solutions further reinforce the reach, efficiency, and responsiveness of prevention programs. By aligning community strengths with health system priorities, resource-limited settings can make meaningful progress toward ensuring that every child has the opportunity to grow and thrive free from HIV.

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AUTHOR'S CONTRIBUTION

Obeagu EI: conceived the idea, writing the manuscript, literature survey. **Obeagu AA:** formal analysis, data processing. Final manuscript was checked and approved by both authors.

DATA AVAILABILITY

The empirical data used to support the study's conclusions are available upon request from the corresponding author.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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