Expanding the use of community health workers in urban settings: a potential strategy for progress towards universal health coverage

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Abstract
Community health worker (CHW) programmes have been used for decades to improve access to health services in rural settings in low- and middle-income countries. With more than half of the world’s population currently living in urban areas and this population expected to grow, equitable access to health services in urban areas is critically important. To understand the extent to which CHW programmes have been successfully deployed in low-income urban settings, we conducted a review of the literature between 2000 and 2018 to identify studies evaluating and describing CHW programmes implemented fully or partially in urban or peri-urban settings. We identified 32 peer-reviewed articles that met our inclusion criteria. Benefits have been documented in several urban settings in low- and middle-income countries including those to address TB/HIV, child health, maternal health and non-communicable diseases through a variety of study designs.

Keywords: Community health, primary health, low- and middle-income countries, urban health

Key Messages
• Community health worker (CHW) programmes have been used for decades to improve access to healthcare in rural settings in low- and middle-income countries. With more than half of the world’s population living in urban areas and this population expected to grow, equitable access to health services for marginalized communities in urban areas will be critical to achieving the Sustainable Development Goals (SDGs).
• The benefits of CHW programmes have already been documented in urban settings in low- and middle-income countries and across several health domains. However, additional research is necessary to identify viable approaches to adapting CHW programmes for urban settings.
• As global and national policymakers deliberate approaches to achieving the SDGs, including for universal health coverage, the delivery of community-based interventions involving CHWs in urban settings should be strongly considered.
Introduction

There is substantial evidence on the efficacy and effectiveness of community health worker (CHW) programmes in low- and middle-income settings (Lewin et al., 2005; Starfield et al., 2005; Black et al., 2017; Scott et al., 2018). Although the design, scope and implementation of CHW programmes differ, most are staffed by a cadre, primarily female, with variable levels of formal training. CHWs are often drawn from their communities and expected to work within their own communities. Remuneration schemes and human resource management mechanisms (e.g., recruitment, in-service training and career progression) vary considerably between programmes (Olaniran et al., 2017).

In the context of a substantial global shortage of health workers and an inequitable distribution of the current health workforce (World Health Organization, 2016; Lozano et al., 2018), expanded implementation and scale-up CHW programmes have been noted as a potential means to support efforts towards achieving health equity through universal health coverage (UHC; Pettigrew et al., 2015; Bhutta, 2017; Hone et al., 2018).

Much of documentation on CHW programme implementation and effectiveness has focused on rural settings (Scott et al., 2018). However, more than half the world’s population now reside in urban settings—a proportion which is expected to continue to grow substantially in coming years (United Nations, 2018). Such settings in low- and middle-income countries are often characterized by high population density, unplanned development and population demands that often exceed service capacity (Galea and Vlahov, 2005; Vlahov et al., 2007).

Recently WHO and UNICEF have called for access to primary and secondary health services in urban settings to achieve UHC and other health-related Sustainable Development Goals (SDGs; World Health Organization, 2018). To contribute to this effort, we conducted a literature review to understand what, if any, evidence exists of successful implementation of community health programmes in urban and peri-urban settings.

Materials and methods

Literature review
We conducted an electronic review of the literature from MEDLINE/PubMed and Google Scholar. The literature review was limited to peer-reviewed articles published in English between 2000 and 2018. Relevant articles were identified using key search terms described in Table 1. We then excluded duplicate citations.

Inclusion and exclusion criteria
To be included in the final review, studies needed to describe health programmes that: (1) were community-based and delivered by CHWs, (2) were implemented fully or partially in urban or peri-urban settings or compared the delivery of community-based interventions in urban and rural areas and (3) were conducted in low- and middle-income countries according to the World Bank atlas method of country classification. One independent study team member reviewed all identified studies using these criteria and a second study team member validated all studies for final inclusion in

Table 1 Review search terms

<table>
<thead>
<tr>
<th>Community-based health</th>
<th>‘community health aide’ OR ‘community health nurse’ OR ‘community medicine’ OR ‘community health officer’ OR ‘community health volunteer’ OR ‘community health worker’ OR ‘community IMCI’ OR ‘community oriented primary care’ OR ‘community volunteer’ OR ‘health extension workers’ OR ‘community-based program’ OR ‘community involvement’ OR ‘community participation’ OR ‘community program’ OR ‘lay health worker’</th>
</tr>
</thead>
</table>
the review. We also assessed the reference lists of included studies to identify additional relevant publications.

No systematic reviews were identified that specifically focused on the implementation of CHW programmes in urban settings from low- and middle-income countries. However, some reviews focused more broadly on community-based health programmes in low- and middle-income countries. Although we excluded such reviews from the current analysis, we checked the references to identify additional potentially relevant studies for inclusion.

Synthesis of results
The initial search strategy yielded 246 studies. Following a full review of these articles, we identified 32 peer-reviewed articles that met our inclusion criteria. We extracted information from articles that describe: study setting, health intervention area, target population, study design, research question, reported results and CHW programme characteristics. We also synthesized the noted advantages of disadvantages relevant to implementing the CHW programmes in urban settings.

Results
Study setting, health intervention area, and target population
Identified studies document community-based CHW programmes in a range of urban settings, including 23 studies conducted in sub-Saharan Africa, 5 in South America and 4 in Asia. Three countries in sub-Saharan Africa had the highest number of studies with five (Kenya and Uganda) or six (Malawi) each.

Studies were categorized into the following programmatic areas: (1) HIV and TB screening and treatment programmes (10/32), (2) child health (11/32), (3) maternal health programmes (8/32) and (4) non-communicable disease screening and treatment programmes (3/32). Of the TB and HIV and non-communicable disease programmes identified, the majority targeted adults. Figure 1 provides an overview of the programmatic areas by region.

Study design, research question and results
The study design, research questions and results of identified studies are described in Table 2. Of the 32 articles identified, 19% (6/32) describe randomized controlled trials (RCTs) conducted in Africa, Asia and South America (Wandwalo et al., 2004; Cooper et al., 2009; Owais et al., 2011; Mcconnell et al., 2016; Kimani-Murage et al., 2017; Matsuzaka et al., 2017), whereas the remaining 81% (26/32) report on observational studies and programme evaluations. Of the latter, three studies compared the effectiveness of programmes in rural vs. urban settings.

Of the studies that report on the efficacy or effectiveness of CHW programmes in urban or peri-urban settings, all demonstrated either positive impact on relevant outcomes of interest or non-inferiority compared with existing clinic-based services. However, these positive results were not necessarily the primary outcomes of interest in the trials. For example, in a trial conducted in urban Nairobi, Kenya, investigators found no measurable differences in early breastfeeding (EBF) practices between women who were visited by CHWs trained in EBF promotion and those who were not. However, EBF increased in both study arms together from 2% to 55% (Kimani-Murage et al., 2017). Researchers from São Paulo, Brazil found that depressive symptoms improved significantly among those who were visited by CHWs; however, there was no measurable difference in depressive symptoms between those who received care from health workers who underwent 1-day training on interpersonal counselling compared with those visited by untrained health workers (Matsuzaka et al., 2017).

None of the identified studies assessed more comprehensive CHW programmes. Most studies (25/32) assessed the effectiveness or impact of one specific health intervention. For example, several studies from urban and peri-urban settings in Peru, Kenya, Malawi, Tanzania and South Africa demonstrated the benefits associated with TB management using CHWs (Dudley et al., 2003; Nyirenda et al., 2003; Wandwalo et al., 2004; Drobac et al., 2006; Ong’Ang’o et al., 2014). Others (7/32) focused largely on the acceptance of services delivered by CHWs by patients or caregivers. These studies were found to be largely favourable. In two different studies conducted in Uganda, researchers observed high acceptance of...
Table 2  Studies evaluating or describing community health worker programmes implemented fully or partially in urban or peri-urban settings between 2000 and 2019

<table>
<thead>
<tr>
<th>Study setting</th>
<th>Study population</th>
<th>Assessment design</th>
<th>Relevant research question(s)</th>
<th>Results/effectiveness</th>
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<tbody>
<tr>
<td>TB and HIV</td>
<td>Children &lt;15 years with MDR-TB</td>
<td>Retrospective cohort study</td>
<td>• Quantify outcomes of children treated for MDR-TB in poor urban communities. • Describe management of MDR-TB in children.</td>
<td>• 94% of children successfully treated equal to or better than results of reported hospital referrals.</td>
<td>Drobac et al. (2006)</td>
</tr>
<tr>
<td>Lima, Peru</td>
<td>Adult MDR-TB patients</td>
<td>Qualitative study</td>
<td>• Highlight challenges to creating successful community-based urban MDR-TB treatment programme.</td>
<td>NA</td>
<td>Shin et al. (2004)</td>
</tr>
<tr>
<td>Urban and rural Kenya</td>
<td>Adult TB patients</td>
<td>Retrospective cohort study</td>
<td>• Assess TB treatment adherence among patients who utilize CHWs to manage illness compared with those who did not in urban settings.</td>
<td>• 26% (OR: 2.63; 95% CI: 2.02–3.48) higher odds for treatment success among those who utilized CHWs to manage illness in urban settings.</td>
<td>Ong’Ang’o et al. (2014)</td>
</tr>
<tr>
<td>Lilongwe, Malawi</td>
<td>Adult TB patients</td>
<td>Pre-post analysis</td>
<td>• Evaluate impact of decentralization of TB programme performance using CHWs.</td>
<td>• 38% reduced hospitalizations. • 72% reduction in average length of hospitalization. • 13% improved cure rate. • 34% improved treatment completion.</td>
<td>Nyirenda et al. (2003)</td>
</tr>
<tr>
<td>Lilongwe, Malawi</td>
<td>Adult TB patients</td>
<td>Cost-effectiveness analysis</td>
<td>• Assess cost and cost-effectiveness of community-based treatment strategies for new TB patients.</td>
<td>• 50% reduction in total annual costs for TB care, compared with conventional hospital-based care.</td>
<td>Floyd et al. (2003)</td>
</tr>
<tr>
<td>Dar es Salaam, Tanzania</td>
<td>Adult TB patients</td>
<td>Non-inferiority randomized control trial</td>
<td>• Evaluate effectiveness of community-based DOT using guardians and former TB patients compared to hospital-based DOT.</td>
<td>• No significant difference in treatment success in community-based DOT strategy vs. hospital-based DOT.</td>
<td>Wandwalo et al. (2004)</td>
</tr>
<tr>
<td>Cape Town, South Africa</td>
<td>Adult TB patients</td>
<td>Quasi-experimental study</td>
<td>• Evaluate community treatment supervision as part of TB programme implementation in intervention setting compared with non-intervention setting.</td>
<td>• Higher treatment cure rates in the intervention area compared with the control area (P = 0.038).</td>
<td>Dudley et al. (2003)</td>
</tr>
<tr>
<td>Lima, Peru</td>
<td>Adult HIV patients</td>
<td>Quasi-experimental study</td>
<td>• Describe clinical outcomes among HIV-positive adults receiving CASA compared with matched controls receiving hospital-based care. • Describe psychosocial outcomes of CASA patients compared with hospital-based patients.</td>
<td>• Increased mean adherence (86.0% vs. 62.5%; P &lt; 0.05). • More likely to have suppressed viral load at 12 months (76.7% vs. 58.3%; P &lt; 0.05). • Improvements in stigma (~10.4 vs. ~1.7; P &lt; 0.01), social support (+12.7 vs. ~9.8; P &lt; 0.01) and self-efficacy (+25.4 vs. +10.7; P &lt; 0.01).</td>
<td>Munoz et al. (2010)</td>
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<tr>
<td>Kampala, Uganda</td>
<td>Adult HIV patients</td>
<td>Retrospective cohort study</td>
<td>• Evaluate community-based ART programme staffed primarily by peer-health workers and nurses.</td>
<td>• 72% of patients active and on therapy approximately 2 years after programme initiation. • 86% of active patients had a viral load &lt;400 copies/ml. • 69% of individuals accepted HBHCT.</td>
<td>Chang et al. (2009)</td>
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<tr>
<td>Kampala, Uganda</td>
<td>Adolescents and adults &gt;15 years</td>
<td>Cross-sectional survey</td>
<td>• Measure acceptance of HBHCT.</td>
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<td>Sekandi et al. (2011)</td>
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<tr>
<th>Study setting</th>
<th>Study population</th>
<th>Assessment design</th>
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<th>Results/effectiveness</th>
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<tbody>
<tr>
<td>Child health</td>
<td></td>
<td></td>
<td>• Identify factors associated with HBHCT acceptance.</td>
<td>Age, sex, marital status and previous HIV test history were associated with HBHCT acceptance.</td>
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<td></td>
<td></td>
<td></td>
<td>• Quantify HIV seroprevalence.</td>
<td>7.4% of patients identified as seropositive.</td>
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<td></td>
<td></td>
<td></td>
<td>• Assess factors associated with HBHCT acceptance.</td>
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<td>Wakiso District (peri-urban),</td>
<td>Children &lt;5 years and their caregivers</td>
<td>Mixed methods study</td>
<td>• Assess perceptions of iCCM value and effectiveness among caregivers and village health teams in peri-urban settings,</td>
<td>iCCM perceived to facilitate timely treatment access.</td>
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<td>Uganda</td>
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<td>Caregivers valued free services, caring attitudes, perceived treatment quality, perceived competency and follow-up of village health teams.</td>
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<td>Five cities in</td>
<td>Children &lt;5 years</td>
<td>Pre-post analysis</td>
<td>• Assess effectiveness of CCMm in urban settings through community medicine distributors.</td>
<td>40% of children with malaria symptoms sought CCMm.</td>
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<td>Ghana, Burkina Faso, Ethiopia and</td>
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<td>• Describe caregiver perceptions of CCMm and knowledge of malaria signs and symptoms.</td>
<td>69% of CCMm patients was treated promptly and correctly.</td>
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<tr>
<td>Malawi</td>
<td></td>
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<td>• Measure early access to care and under-five mortality during proactive community case manage-</td>
<td>CCMm programme associated with improved caregiver knowledge of malaria.</td>
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<td>ment including MCH messages, case detection and doorstep care together with CHW supervision,</td>
<td>320% (OR: 3.20; P &lt; 0.0001) higher odds of early effective antimalarial treatment of children after intervention.</td>
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<td>removal of user fees and primary care infrastructure improvements.</td>
<td>55% (OR: 0.45; P &lt; 0.0001) lower odds of febrile illness after intervention.</td>
</tr>
<tr>
<td>Bamako, Mali</td>
<td>Children &lt;5 years</td>
<td>Interrupted time series analysis</td>
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<td>7 deaths in children per 1000 live births after intervention.</td>
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<tr>
<td>Urban and rural areas, Uganda</td>
<td>Children &lt;5 years</td>
<td>Cross-sectional survey</td>
<td>• Evaluate differences in use of CHWs for management of malaria and pneumonia treatment between urban and rural areas.</td>
<td>21% (OR: 0.79; P = 0.02) lower odds of seeking care from CHW compared with rural children.</td>
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<tr>
<td>São Paulo, Brazil</td>
<td>Children &lt;5 years</td>
<td>Retrospective cohort study</td>
<td>• Examine whether new family health programme has had impact on child health.</td>
<td>42% (OR: 0.58; 95% CI: 0.34–0.91) lower odds of mortality after intervention.</td>
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<td>82% (OR: 0.18; 95% CI: 0.04–0.79) lower odds of mortality in neonates after intervention.</td>
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<td>No significant impact of intervention on birth weight, gestational length or stillbirth.</td>
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<td>Community-based health planning and services programme adopted well by healthcare workforce.</td>
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<tr>
<td>Accra, Ghana</td>
<td>CHWs delivering reproductive, maternal, neonatal, child and adolescent health services.</td>
<td>Key informant interviews</td>
<td>• Document reactions of healthcare workforce towards implementation of community-based health planning and services programme in urban informal settlements.</td>
<td>Nwamene et al. (2018)</td>
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</table>
| Kiambu County (peri-urban), Kenya   | Infants <1 year           | RCT                      | • Evaluate pilot CHW programme that includes home visits or calls to new mothers 3 days after delivery with CHW-administered postnatal checklist compared with the standard of care.                                                                 | • No significant difference in care seeking between intervention groups and standard of care.  
• 2.0 ($P = 0.014$) and 1.8 days ($P = 0.034$) earlier care seeking for home visits or calls compare with standard of care.  
• No significant difference in neonatal health knowledge between intervention groups and standard of care.                                                                                                                                  | McConnell et al. (2016)                                                          |
| Nairobi, Kenya                      | Children <5 years and their caregivers | Mixed methods study      | • Assess social impact of a home-based CHW counselling intervention aimed at promoting optimal maternal infant and young child nutrition using a social return on investment approach.                                                                 | • Intervention viewed as highly effective with social value for mothers and their children.  
| Karachi, Pakistan                  | Children 12–23 months     | RCT                      | • Assess impact of CHW-administered immunization promotion intervention to support infant immunization completion.                                                                                                                                                                                                 | • 39% (RR: 1.39; 95% CI: 1.06–1.81) higher immunization completion in the intervention group relative to the control group.                                                                                                                      | Owais et al. (2011)                                                             |
| Nairobi, Kenya                      | Children 0–6 months       | Cluster RCT               | • Measure effectiveness of home-based intervention with CHWs trained in promoting EBF for 6 months compared with CHW home visits without training.                                                                                                                                                                                                 | • No significant difference in EBF between control or intervention groups.  
• Increase in EBF from 2% to 55% in both groups.                                                                                                                                                                                                                                                   | Kimani-Murage et al. (2017)                                                     |
| Mumbai, India                       | Children <3 years         | Mixed methods study      | • Evaluated adaptation of large-scale, community-based management of acute malnutrition programme in children.                                                                                                                                                                                                                                        | • 19% (OR: 0.81; 95% CI: 0.67–0.99) lower odds malnourishment in intervention area compared with control area.  
• Success driven by engagement with communities and presence/supervision of field staff.                                                                                                                                                                                                           | Shah More et al. (2018)                                                        |
| Maternal health                     | Volunteer CHWs            | Prospective cohort study | • Understand factors associated with retention of volunteer CHWs in mature programme where they receive financial incentives for maternal health interventions.                                                                                                                                                                                                 | • 45% (RR: 1.45; 95% CI: 1.10–1.91) higher retention among CHWs who received positive community appraisals.  
• 225% (RR: 2.25; 95% CI: 1.08–4.71) higher retention among CHWs who received refresher trainings.                                                                                                                                                                                                 | Alam and Oliveras (2014)                                                       |
| Five Kenyan cities                  | Women aged 15–49 years    | Longitudinal evaluation  | • Undertake impact evaluation of maternal health programmes with CHW component in four countries to determine demand-side and supply-side intervention components associated with increased use of modern family planning methods.                                                                 | • Overall increase in modern contraceptive use from 54% at baseline to 61% 4 years later.  
• Higher proportion of women using modern contraceptives among those who discussed family planning with CHW ($P < 0.10$) and attended community events ($P < 0.01$).                                                                 | Benson et al. (2017)                                                           |

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</table>
| Lilongwe, Malawi | Pregnant women living with HIV | Prospective programme evaluation | • Assess multipronged approach utilizing trained CHWs to conduct home-based HIV testing, link HIV-infected children to care and provide support to PMTCT mothers. | • 96% of mothers and 98% of infants received ART prophylaxis.  
• 81% of infants were tested for HIV by PCR and started on cotrimoxazole. | Kim et al. (2012) |
| Lilongwe, Malawi | Children who are HIV-exposed and -infected | Prospective programme evaluation | • Describe impact CHW programme to improve identification and enrolment into care of HIV-exposed and -infected children. | • 6-fold increase in per month enrolment of HIV-infected children into care.  
• 7-fold increase in per month enrolment of HIV-exposed children into care. | Ahmed et al. (2015) |
| Urban and rural, Uganda | HIV-infected pregnant mothers and their infants | Operational research | • Evaluate use of HIV-infected peer mothers, community lay persons and village health team members to improve post-neonatal follow-up and early infant diagnosis for HIV. | • 39% incremental increase in women who returned for 6-week postnatal visit from 38% at baseline to 79% among study participants ($P < 0.0001$).  
• 21% incremental increase in early infant diagnosis from 54% at baseline to 86% among study participants ($P < 0.001$). | Namukwaya et al. (2015) |
| Karachi, Pakistan | Women in first 2.5 years after childbirth | Quasi-experimental study | • Assess effectiveness of counselling from minimally trained CHWs in reducing anxiety/depression, the rate of recurrence and the interval preceding recurrence in women during first two and a half years after childbirth. | • Significant decline in level of anxiety and depression found in both the counselled and the non-counselled groups at 4 and 8 weeks ($P < 0.001$). | Ali et al. (2010) |
| Manzini (peri-urban), Swaziland | Pregnant or recently delivered women | Cross-sectional study | • Measure burden of antepartum depression and identify risk factors among women. | • 23% of women identified with antepartum depression using standardized scale.  
• 10% of women showed signs of severe depression.  
• Women with multiple socioeconomic stressors found to be more likely to have antenatal depression.  
• Increase in sensitivity ($P < 0.05$) and reduction in intrusiveness ($P < 0.05$) among intervention group in interactions with their infants compared with control group.  
• 70% (OR: 1.70; $P < 0.05$) higher odds of secure infant attachments at 18 months compared with control group. | Malqvist et al. (2016) |
| Khayelitsha (peri-urban), South Africa | Women in late pregnancy until 6 months postpartum | RCT | • Assess efficacy of intervention designed to improve mother–infant relationship and security of infant attachment by home visits by previously untrained lay community workers who provided support and guidance in parenting. | • CHWs currently fulfil a variety of roles in management of NCDs, including education, screening and an integrated approach to adherence support. | Cooper et al. (2009) |
| Non-communicable disease  
Cape Town, South Africa | CHWs | Qualitative research | • Explore current roles of CHWs supporting NCD programmes. | • CHWs currently fulfil a variety of roles in management of NCDs, including education, screening and an integrated approach to adherence support. | Tsolekile et al. (2014) |
home-based HIV counselling and testing administered by CHWs (Sekandi et al., 2011) and integrated community case management for common childhood diseases, such as pneumonia and diarrhoea (Altaras et al., 2017). One study from Dhaka, Bangladesh assessed factors associated with CHW retention, which included positive community appraisals and regular refresher trainings (Alam and Oliveras, 2014). Of the studies that report on the efficacy or effectiveness of CHW programs in urban settings, all demonstrated either positive impact on relevant outcomes of interest or non-inferiority compared with existing clinic-based services.

**CHW programme characteristics**

The studies identified describe CHW roles to include: (1) treatment of diseases, (2) community education and the promotion of healthy behaviours, (3) counselling services, (4) conducting disease screening and managing referrals if necessary and (5) collection of relevant health data. Many of the identified studies describe CHW programmes that include more than one of these roles. For example, a qualitative study in Cape Town, South Africa explored the roles of CHWs in delivering non-communicable disease services, including education, screening and an integrated approach to adherence support (Tsolekile et al., 2014). Where studies describe CHWs who fulfill only one role, that role is largely focused on the promotion of healthy behaviors or counseling services.

There was evidence that in some urban and peri-urban settings, CHWs have been deployed successfully as part of efforts to decentralize services from facility-based to community-based care while maintaining or increasing care quality and improving access to and coverage of formal primary health services. For example, in one study from Kenya, investigators reported that CHWs in urban settings were able to conduct more home visits due to the concentration of households required to visit in urban areas (Ong’Ang’o et al., 2014). Relative to rural settings, CHWs in urban settings in Kenya, Tanzania and Uganda were also observed to have better communication with the tertiary health system to manage patient referrals and handle complicated cases (Wandwalo et al., 2004; Chang et al., 2009; Ong’Ang’o et al., 2014), and in Uganda malaria treatment services were provided earlier than in rural settings (Rutebemberwa et al., 2012).

Four studies from Africa and one study from South America demonstrated economic benefits relative to facility-based services in terms of reduction in total programme costs compared with conventional hospital-based care (Floyd et al., 2003; Drobac et al., 2006; Benson et al., 2017), number and length of hospitalizations (Nyirenda et al., 2003), as well as lower costs to families (Altaras et al., 2017). Another benefit reported from studies in Karachi, Pakistan (Ali et al., 2010) and Lima, Peru (Shin et al., 2004) was that CHWs were able to establish a close rapport with patients and communities which was found to improve the delivery of health services, identify family contacts at risk of infectious diseases transmission and improve overall morale among CHWs.

With regards to training requirements for CHWs, one study from South America and two studies from Africa reported that CHWs could deliver additional health services beyond those for which they were already responsible with little (Floyd et al., 2003; Matsuoka et al., 2017) or potentially no additional training (Kimani-Murage et al., 2017). In one cost-effectiveness analysis in Lilongwe, Malawi, training costs were found to be a small proportion of overall CHW programme funding (Floyd et al., 2003). However, five studies from multiple regions noted that additional or more frequent CHW training for delivering the additional health services could increase the effectiveness of the programmes (Wandwalo et al., 2004; Drobac et al., 2006; Alam and Oliveras, 2014; Tsolekile et al., 2014; Nwameme et al., 2018). Of note, one such study conducted in Dhaka, Bangladesh found that refresher trainings were associated with longer retention in urban settings (Alam and Oliveras, 2014).

Programme-specific barriers reported by at least one study each included loss to follow-up in urban Uganda associated with high mobility populations living in urban settings (Chang et al., 2013; Namukwaya et al., 2015). Lower acceptance of home-based care for HIV counselling and testing relative to rural areas potentially attributable to greater access to testing sites was also reported in a study in urban Uganda (Sekandi et al., 2011). A reported barrier from urban Malawi was the low acceptance of TB case management
support from trained CHWs, including preferences for the provision of services from family members or clinic-based health workers, health worker biases against CHW involvement in TB case management, or low understanding among patients of the role of CHWs (Nyirenda et al., 2003). One study also commented on the competition with other clinic-based providers in urban areas in five African cities (Akweongo et al., 2011).

In the studies in Kenya and Uganda where rural and urban programmes were compared, studies reported better treatment adherence (Ong’Ang’o et al., 2014), earlier delivery of child health services (Rutebemberwa et al., 2012) and improved follow-up with patients (Namukwaya et al., 2015) compared with rural areas.

There was very little information in any of the studies reviewed on CHW programme design, management or administration. None of the studies identified describe payment or supervision structures, recruitment policies or quality assurance schemes. Further, none of the identified studies described if or how the programmes interacted with the private healthcare providers or the private healthcare system.

Discussion

There is remarkably little evidence published specifically on CHW programmes in urban settings. For example, a recent systematic review identified 75 systematic reviews that have been published on CHW programmes around the world (Scott et al., 2018). None of the identified systematic reviews reported geography-stratified findings. Given that living in urban settings in itself is considered a risk factor for poor health outcomes (Galea and Vlahov, 2003; Vlahov et al., 2007), it will be important to understand the political, structural, social and economic factors which may affect implementation of CHW programmes in these settings compared with rural environments. These kinds of considerations, as well as those related to efficiency, efficacy and costs, will be important to policymakers considering deployment of such programmes.

All of the studies identified as part of this review document some level of effectiveness of urban CHW programmes, implemented in a range of country contexts and disease areas. Although none explicitly describe what, if anything, makes the programme unique to urban settings, some overall inferences are possible. First, in many urban settings, tertiary care is often the first point of contact for patients. In the studies reviewed, there is initial evidence of cost savings to the healthcare system by treating patients within the community rather than in health facilities. Such task shifting could decrease the burden to the healthcare system in terms of patient load. In addition, whereas physical accessibility to clients (e.g. distance from health centre) is noted as a major barrier to implementation of CHW programmes in rural settings, this was not identified as an issue in any of the studies reviewed, suggesting additional efficiencies from CHW programmes in urban settings in terms of number of clients able to be visited or seen. One study, in fact, notes that the high population concentration contributed to the effectiveness of the programme (Ong’Ang’o et al., 2014). Finally, where referral for treatment was required and could be facilitated by a visit from a CHW, referral facilities were largely noted as accessible to patients in urban settings. Taking these benefits together with the broad acceptance of CHW programmes, the expansion of CHW programmes in urban settings could help advance health equity in urban settings.

However, the current review suggests that additional research might be required to inform the introduction and expansion of such programmes in urban settings. Of note, missing in the studies reviewed was a description of the programme characteristics that would impact assessment of feasibility for scaling up (e.g. description of the training, supervision or payer schemes for the CHW programmes described in the literature).

In addition, only three studies addressed cost-effectiveness or provided any cost comparison to the standard of care. These studies were predominantly conducted in Africa and reported low human resource costs, including salaries and training costs. More evidence is required to understand the potential economic benefits of urban CHW programmes in settings with higher human resource costs, which could be critical for policymaking purposes. There were also few studies that compared implementation of the same CHW programme in rural vs. urban settings, making it difficult to extract lessons on what might help with adaptation or implementation of such programmes based on geography. Such studies can help provide insights into how CHW programmes can be adapted to urban settings and inform a more thorough understanding of any programme adaptations required for implementation of community-based services in urban settings.

Finally, the majority of studies was focused on HIV, TB and maternal-child health. These diseases continue to represent a large burden of disease in many low- and middle-income countries and the studies identified here should provide policymakers and programme managers with sufficient evidence for the relevance of CHW programmes in such settings. However, relatively few studies addressed the performance of CHW programmes in the areas of non-communicable diseases, which represent a significant and growing public health disease burden in many urban settings around the world (Roth et al., 2018).

Three countries in sub-Saharan Africa provide the majority of evidence on the role of CHW programmes in urban settings: Malawi, Uganda and Kenya. The relative number of studies in these countries could reflect the prioritization of community-based care in these countries, the presence of large research organizations or donor preferences. Nevertheless, the range of health services provided in urban settings in these countries and the largely promising results reported in these studies indicate that CHW programmes in such settings could be designed to address several concurrent health challenges.

This review has a number of limitations. First, we only identified programmes described in the academic literature. As a result, the results of this review should not be interpreted as a comprehensive assessment of CHW efforts in urban settings as many programmes are not documented in the peer-review literature. Future assessments could also consider the analysis of non-peer-reviewed publications or ‘grey’ literature. Some papers may have been published that did not include keywords in the abstracts. This limitation may have resulted in an under identification of relevant studies. Finally, almost all studies identified indicated the positive effect of CHWs on health outcomes in urban areas. As with other reviews, the present analysis could be affected by publication bias if negative or null results are not described in the academic literature.

Conclusions

Considering the substantial global shortage of health workers, the growing trend of urbanization and the effectiveness of CHW programmes, such programmes should be considered as viable approaches for increasing access to health services including in urban settings. This is particularly pertinent as global and national policymakers deliberate approaches to ensuring UHC and the...
achievement of health-related SDGs. However, future studies on effectiveness of CHW programmes in urban settings should also assess systems issues, including costs, quality assurance, linkages with private and informal providers, regulation, training, payer mechanisms, community acceptability and other operational issues which will need to be better understood to enable programme expansion, if warranted. Understanding these considerations will be crucial to policymakers for adoption and expansion.

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