Title. Community health workers and adolescent health and well-being across sub-Saharan Africa: A systematic review

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Abbreviations: AIDS, Acquired Immune Deficiency Syndrome; ANC, Ante-natal Care; ART, Anti-retroviral Therapy; BASE, Bielefeld Academic Search Engine; CBCL, Child Behaviour Checklist; CBT, Cognitive Behavioural Therapy; CI, Confidence Interval; cRCT, Clustered Randomised Controlled Trial; CATS, Community Adolescent Treatment Supporter; CHW, Community Health Worker; CIAO, Colombia International Affairs Online; DFID,

Department for International Development; GAMA, Global Action for Measurement of Adolescent Health; GRADE, Grading of Recommendations, Assessment, Development and Evaluations; HB, Hepatitis B; HEW, Health Extension Worker; HIV, Human Immunodeficiency Virus; IFPRI, International Food Policy Research Institute; ITN, Insecticide-Treated Net; IPV, Intimate Partner Violence; JBI, Joanna Briggs Institute; LMICs, Low- and Middle-Income Countries; MD, Mean Difference; NGOs, Non-governmental Organisations; NRSIs: Non-randomised studies of intervention; ODD, Oppositional Defiant Disorder; OR, Odds Ratio; OIS, Optimal Information Size; OPM, Oxford Policy Management; PATH, Pathfinder International Programme for Appropriate Technology in Health; PEBRA, Peer Educator Based Refill of ART; PHQ-9, Patient Health Questionnaire-9; PICO, Population, Intervention, Comparator and Outcome; PrEP, Pre-Exposure Prophylaxis; PSI, Population Services International; PST, Problem-Solving Therapy; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-analyses; PTSD, Post-Traumatic Stress Disorder; PTS, Post-Traumatic Stress; R4D, Results for Development; RCT(s), Randomised Controlled Trial(s); RR, Risk Ratio; SMD, Standardised Mean Difference; SSA, sub-Saharan Africa; SRHR, Sexual and Reproductive Health and Right; STI, Sexually Transmitted Infection; TB, Tuberculosis; UNICEF, United Nations International Children's Emergency Fund; VMMC, Voluntary Medical Male Circumcision; WHO, World Health Organisation.

Abstract

Introduction. Adolescence represents a pivotal stage of development. Community health workers (CHWs) may constitute a valuable approach to addressing adolescent health challenges in sub-Saharan Africa (SSA). This review systematically synthesised evidence on the effectiveness of CHW-led interventions to improve adolescent health and well-being in SSA.

Methods. We searched 12 databases and 19 grey literature sources for relevant studies published between January 2014 and October 2024. Interventions were classified by settings (community or school) and by delivery (lay or paraprofessional, peer- or adult-led). Vote-counting and meta-analyses were conducted, alongside risk of bias and Grading of Recommendations, Assessment, Development and Evaluations (GRADE) assessments.

Results. Fifty studies were included spanning across 11 countries and 21 outcomes. All outcomes were summarised narratively. Meta-analyses showed moderate-certainty evidence for reducing post-traumatic stress (PTS), low-certainty evidence for reducing depression and improving human immunodeficiency virus (HIV) viral suppression, and very low-certainty evidence for increasing modern contraceptive use. No clear effects were observed for HIV and sexual health knowledge or adolescent pregnancy, all with very low certainty.

Conclusion. CHW-led programmes show promise for improving adolescent mental health and HIV suppression outcomes and may support contraceptive use in SSA. However, future research is needed on other adolescent health domains.

Keywords:

Community health worker, Adolescent, Africa, Mental health, HIV, Sexual and reproductive health

Implications and Contribution (50 words)

Drawing on 50 studies, this systematic review consolidates evidence on community health workers' role in supporting adolescent health across Africa. It shows clear potential to improve mental health, HIV, and modern contraceptive use, while exposing evidence gaps in other domains and setting priorities for future investment and research.

Introduction

Adolescence, especially early adolescence, is a formative period of growth and development [1]. It offers a critical window to shape lifelong health behaviour and values, offering an ideal opportunity to promote healthy habits and informed decision-making [2,3]. The stakes are particularly high in Africa, which is home to nearly 258 million youth in 2020, making it the world's youngest region [4].

Despite progress in many areas, adolescents in sub-Saharan Africa (SSA) continue to face persistent health and well-being challenges [5]. Undernutrition and underweight remain widespread, while in the meantime rates of overweight are rising [6]. Antiretroviral treatment (ART) coverage remains below target, especially in Eastern and Southern Africa [7]. Mental health issues, such as post-traumatic stress (PTS) and depression, are increasingly recognised but inadequately addressed [8,9]. Although primary school enrolment has improved, lower secondary education completion and literacy remain low [10]. Adolescent girls face added risks, including sexual coercion, gender-based violence, child marriage, unmet need for modern contraception, and pregnancy [11,12].

To address these challenges, it is essential to tackle barriers to high-quality, youth-friendly health services, including cost of care, judgemental provider attitudes, low health literacy, long distances to health facilities, lack of privacy, inconvenient hours, fragmented care and social norms [13–15]. Community health workers (CHWs) may offer a promising approach to mitigating some of these challenges. Widely deployed across Africa, CHWs have been instrumental in delivering culturally responsive health promotion and education, extending facility-based services to households, and connecting individuals with formal healthcare systems [16,17].

While CHWs' contributions to maternal and child health, immunisation, and communicable diseases like human immunodeficiency virus (HIV), tuberculosis (TB), and malaria are well-documented, their role specifically in adolescent health remains underexplored [18–25]. A 2013 review on CHWs and adolescent health services in Africa identified one relevant study, in which CHWs' contribution within a multi-component intervention was unclear, highlighting a major gap in the literature [21]. This review re-examined the evidence a decade later to synthesise findings on CHW-led interventions targeting a range of adolescent health and well-being outcomes [26]. The specific objectives of the review were to (i) map and summarise CHW-delivered interventions targeting adolescent health and well-being in SSA, (ii) evaluate their effectiveness, and (iii) examine gender differences in outcomes.

Methods

We conducted a Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA)-compliant review of the role of CHWs in improving adolescent health and well-being across SSA [23,24]. The review protocol was registered in PROSPERO (CRD42024618546). This analysis focuses exclusively on quantitative studies, as integrating qualitative evidence was beyond the scope of reporting in a single journal article.

Search and Information Sources

The following electronic bibliographic databases were searched: PubMed, Embase, Global Health, Medline, PsychINFO, Scopus, CINAHL, ERIC, Web of Science, Proquest Social Science, EconLit, Premium Cochrane Library, Campbell Collaboration.

We supplemented our bibliographic database searches with grey literature searches on Google Scholar and 18 websites of relevant implementing agencies and international organisations (see Appendix A.1). As recommended, searches on Google Scholar and other websites were limited to the first 300 results [27].

The search string was composed of three elements: 1) population, 2) intervention, and 3) a country filter. We did not include a specific outcome element in our search string due to the broad nature of our focus on adolescent health and well-being. We consulted a Bodleian librarian at the University of Oxford to refine our information sources and search terms. An example search string for Elsevier's Scopus database was provided in Appendix A.2.

We also conducted backward searches of the reference lists of all included studies and two highly relevant systematic literature reviews.

Eligibility criteria

Quantitative studies and quantitative sections from mixed-methods studies published from January 2014 to October 2024 were eligible for inclusion. This cutoff of publication date was set since a previous systematic review had covered studies up to 2013 [21].

Eligible studies focused on interventions delivered by CHWs and their effect on adolescent health and well-being outcomes in Eastern, Southern, Western and Central Africa [28]. In this review, CHWs were defined according to the World Health Organisation (WHO) definition as health workers based in communities, conducting outreach beyond primary healthcare facilities, or working at peripheral health posts not staffed by doctors or nurses[1]. They typically receive less than two years of formal training but at least some training if only for a few hours, and are either paid or volunteer. We further categorised CHWs as adolescent peers if they were aged <24, and adults if they were aged 24 years and older, and as either lay workers or paraprofessionals largely based on Olaniran et al. (2021) [34] (for detailed definitions we used, see Appendix B).

Our target population for this review was adolescents aged 10-19. We also included studies with broader age ranges if they met one of the following criteria: (1) they reported age-disaggregated results for a subgroup within the 10–19 age range, or (2) the median (or mean if the median was unavailable) age of participants fell between 10 and 19 years, and the overall age range lay between five and twenty-four years old. Where populations were referred to as senior primary, secondary or first-year high school students, we assumed that their age range fitted the criteria above. This decision was made to capture as much relevant

[1] Many of the studies we reviewed evaluated lay workers, particularly peers, who delivered education, counselling and support to adolescents in primary healthcare facilities or hospitals. However, we did not classify these as community health worker interventions unless they included outreach activities, such as home visits, service provision (e.g., ART distribution), or community-based event organisation. Examples of studies that did not meet these criteria include the VUKA Family Programme [29], the Integrated Youth Centre Rewards Programme [30], in-clinic adolescent peer group support for engagement [31], the Family Clinic Day Intervention [32], and the Teen Club Intervention [33].

insight as possible in the literature while acknowledging that adolescence is a period defined by puberty and rapid growth.

Comparators included studies where the intervention was compared to no service, placebo, usual care or standard care as defined by the authors. Studies without a comparator group were excluded. Eligible studies evaluated intervention effectiveness using one of the following designs: (i) randomised control trials; (ii) quasi-experimental evaluations; (iii) cohort studies with comparison groups assessed under similar settings; (iv) pre-post intervention, with or without comparison group; and (v) cross-sectional studies with a clearly defined comparison group. Additionally, studies were required to have a minimum sample size of 50.

Outcomes for this review were assessed across two dimensions. First, adolescent health knowledge and perceptions as characterised by the Health Belief Model [35], and second, well-being using the five broad domains in the WHO framework, including (i) good health and optimum nutrition, (ii) safety and a supportive environment, (iii) connectedness, positive values and contribution to society, (iv) learning, competence, education, skills and employability, and (v) agency and resilience, supplemented with sub-domains in the Global Action for Measurement of Adolescent Health (GAMA) framework [36,37].

Study records.

Data management. References returned from bibliographic database and grey literature searching were downloaded into EndNote by J.C. for organisation and deduplication. Titles and abstracts were then uploaded to the screening software Rayyan to facilitate efficient and blinded screening by reviewers.

Selection of studies. Titles and abstracts were screened by two independent reviewers (Y.L. and J.C.), working in a blinded manner, to identify potentially relevant studies [38]. For

studies without full abstracts, they examined the full text to determine inclusion. Upon completion of screening, the reviewers compared their results and resolved any discrepancies through discussion. If discrepancies couldn't be resolved, W.R. was consulted for their opinion [38]. The second stage involved full-text review of studies identified as relevant in the initial screening. Y.L. and J.C. examined each full-text study to ensure adherence to the eligibility criteria. Any studies excluded at this stage were accompanied by documented justifications for exclusion. For the grey literature search, O.A. reviewed the titles, abstracts or executive summaries of each study downloaded from grey literature sources. If studies lacked abstracts or executive summaries, the introduction and conclusion sections were examined to determine inclusion. The second stage of the grey literature review followed a similar process as the review of bibliographic studies described above. Finally, Y.L. conducted backward searches and assessed inclusion/exclusion for all studies. W.R. reviewed each decision at full-text screening stage, followed by discussion to reach agreement.

Data items and extraction. Y.L. and B.S. split the included studies for systematic data extraction using pre-prepared and piloted data extraction forms in Microsoft Excel. Since no study met our inclusion criteria from the grey literature, no data extraction was conducted. The data items we collected included study identification details, study characteristics, participant information, programme details, outcomes, effects and gender related analysis. Details about the data items are reported in Appendix C. Reciprocal random checks of ten-percent of studies extracted by Y.L. and B.S. identified minimal discrepancy, ensuring high-quality data extraction.

Quality Appraisal. The relevant Joanna Briggs Institute (JBI) tools were used to assess the quality of included randomised control trials, non-randomised studies of intervention (NRSIs) and cross-sectional studies [40] independently by Y.L. and B.S. Any discrepancies were resolved during discussion among the two assessors and W.R. Grading of

Recommendations Assessment, Development and Evaluation (GRADE) was used to assess the certainty of evidence for each primary outcome [41–47] by Y.L. with revision and advice from B.S. and W.R.

Data analysis. When at least three studies demonstrated similarity in interventions and outcome measurements and reported statistical data that could be harmonised, we pooled the results using random-effect meta-analysis to generate summary effect estimates, led by W.R. and Y.L. Effect size conversions were performed independently by W.R. and Y.L., with any discrepancies resolved through discussion. We used *MetaConvert* R package to convert from odds ratios to risk ratios, and adjusted incidence rate ratios were converted to risk ratios using formulas in Hanley (2018) [48]. In accordance with the GRADE handbook, heterogeneity was estimated based on the I-squared statistic. For outcomes with substantial heterogeneity in their measurement across studies, results were synthesised narratively using vote-counting. Subgroup analyses by gender and socioeconomic status were prespecified in our protocol. However, due to the limited number of studies per outcome, formal statistical analyses (e.g. meta-regression) were not feasible. Nevertheless, gender-related findings are reported in the results narratively.

Results

Literature search

The search returned 5,003 articles after removing duplicates (see Appendix D. PRISMA flowchart). After screening titles and abstracts, we sought full text for 122 articles. At full-text review, 72 were excluded with reasons detailed in Appendix E, leaving 50 studies (48 quantitative studies and 2 mixed-methods).

Study characteristics

Among the 50 studies included, twenty-four studies were randomised controlled trials (RCTs). Three used propensity score matching [49–51], and one applied fuzzy difference-in-differences design [52]. Two were controlled pre-post studies. Fourteen were uncontrolled pre-post studies[2]. One study was cross-sectional [57]. Another study spanned four settings with two adopting a controlled pre-post design and two an uncontrolled pre-post design [58]. Three studies collected both pre- and post-intervention data with intervention and control groups, but derived (key) results only using post-intervention data without sufficient justification [59–61]. Finally, one was controlled cross-sectional intervention study that collected only post-intervention data but compared outcomes between intervention and control groups [62].

All were published in English. Eleven studies were in Western Africa, 18 in Eastern Africa and 17 in Southern Africa. Four studies spanned across multiple countries. Appendix F provided detailed information on included studies' design, interventions, sample size, target populations and outcome addressed.

[2] Please note that four studies were described as controlled pre-post design, but they were actually only comparing outcomes before and after the intervention for intervention and control groups separately without accounting for all data [53–56]. Therefore, we included them into uncontrolled pre-post studies.

Target populations

Fifteen studies examined adolescents within the age range of 10-19 years [57,63–66,49,67,61,68,60,69–71,58,72] with the minimum age no less than seven years old. Twenty-nine studies examined a wider age range (i) *either* including both adolescents and young adults with median age falling within the 10-19 age range and maximum age no greater than 24 [53,73,54,74–81] (ii) *or* including both children and adolescents with median age falling between 10-19 and minimum age no less than five years old [82–86,52,87–90], or (iii) *otherwise* providing age-disaggregated results for the adolescent group [50,62,91–96]. The remaining six studies referred to senior primary, secondary or first-year high school students [51,55,56,59,97,98].

CHW interventions[3] *and Comparators*

We identified 26 peer-, 26 adult- and three peer plus adult CHW-delivered programmes/interventions, with 36 taking place in the community settings, 18 in school settings and one in spanning across both community and school[4]. Among the evaluated interventions/programmes, peer CHWs were active in both rural and urban areas, with a predominant support base from non-governmental organisations (NGOs). They typically received only a few days of training. In contrast, adult CHWs primarily operated in rural areas, often receiving over a week of training, and were supported by both government and NGOs. Key design features of evaluated programmes are summarised in Figure 1.

The primary focus areas of evaluated programmes are summarised in Figure G.1 in Appendix G. Peer CHW interventions in community settings commonly centred on health

[3] The summary numbers in this section are at the intervention level rather than study level.
[4] The total number of programmes/interventions across community and school settings, as well as the total number of programmes led by peer and adult CHWs, are both 55. These totals exceed the 50 included studies because they are counted at the intervention level rather than the study level. Additionally, three studies involved two countries, and one study involved three countries.

education and awareness building, such as *Mzake* peer group intervention in Malawi [91]. Psychosocial support was exemplified by the Zvandiri programme's peer-led counselling sessions in Zimbabwe [69,70,80]. They also involved service delivery, engagement and linkages like the Yathu Yathu strategy, which featured community-based youth hubs staffed by peer support workers in Zambia [77], and Peer Educator-Based Refill of ART (PEBRA) model in Lesotho, which provided health-based differentiated service delivery using an e-health application [78]. In school settings, peer CHWs typically delivered structured education sessions designed to improve knowledge and promote behavioural change. Examples included lay-female peer-led sessions on cervical and breast cancer awareness targeting adolescent girls in Nigeria [82,83], and a behavioural change and health promotion programme focused on dietary diversity in Ethiopia [61].

Adult CHW interventions in community settings also covered a broad range of activities. These included the delivery of health education, promotion and prevention messages; psychosocial and mental health support, such as cognitive behavioural therapy (CBT)-based interventions in Kenya, Sierra Leone, Tanzania and Zambia [74,75,87,89,90], and psychodrama sessions in Mozambique [79]. Adult CHWs also played a role in facilitating access to care, as seen in the *relais communautaires* model in Niger [57], and provided direct services and social support such as HEWs in Ethiopia [49,52,94]. Five studies examined adult CHW programmes implemented in school settings including groups of adolescents and their caregivers to address behavioural problems and mental health issues in Uganda [85,86], psycho-education group sessions focused on mental well-being [84], group education sessions focused on HIV and sexual and reproductive health and rights (SRHR)-related topics in Malawi [60], Nigeria [62] and Kenya [98], and sanitary pad distribution in Kenya [98].

Three programmes integrated both peer and adult CHWs, including Ethiopia's Smart Start initiative [58], participatory group education sessions on HIV prevention and sexual health in Nigeria [62] and support sessions to mitigate social isolation and stigma of adolescent motherhood in Zimbabwe [71].

Outcomes

The identified evidence spanned 16 outcome domains, highlighting the broad potential of CHW-led interventions to support diverse aspects of adolescent health and well-being. Within these domains, studies focused on three key subdomains, which were (i) health knowledge, attitude and perceptions, (ii) health behaviours and outcomes, and (iii) socioeconomic well-being, summarised in Figure 2.

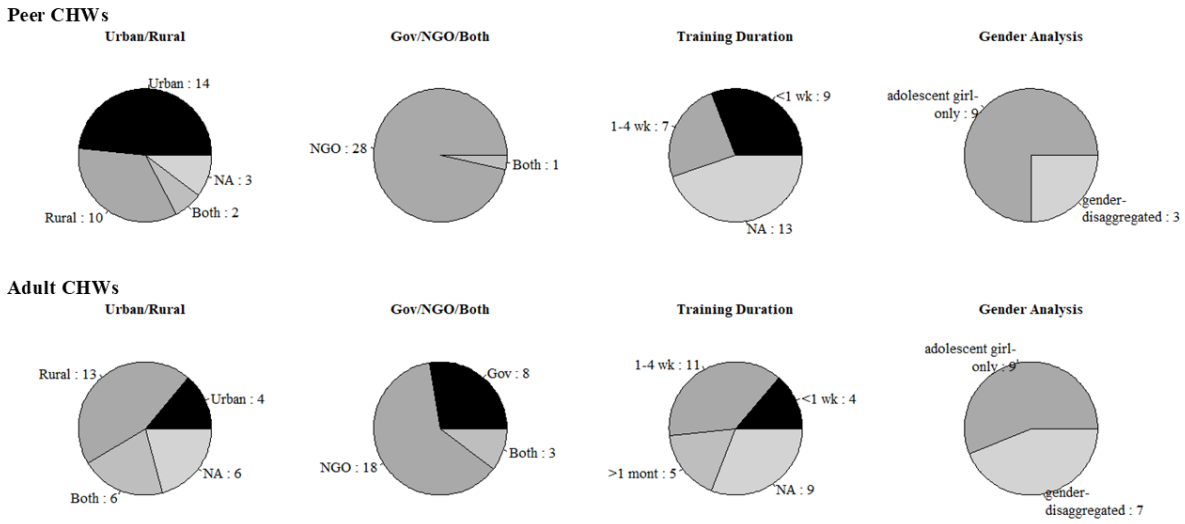

Figure 1. Programmatic design features of the evaluated CHW interventions.

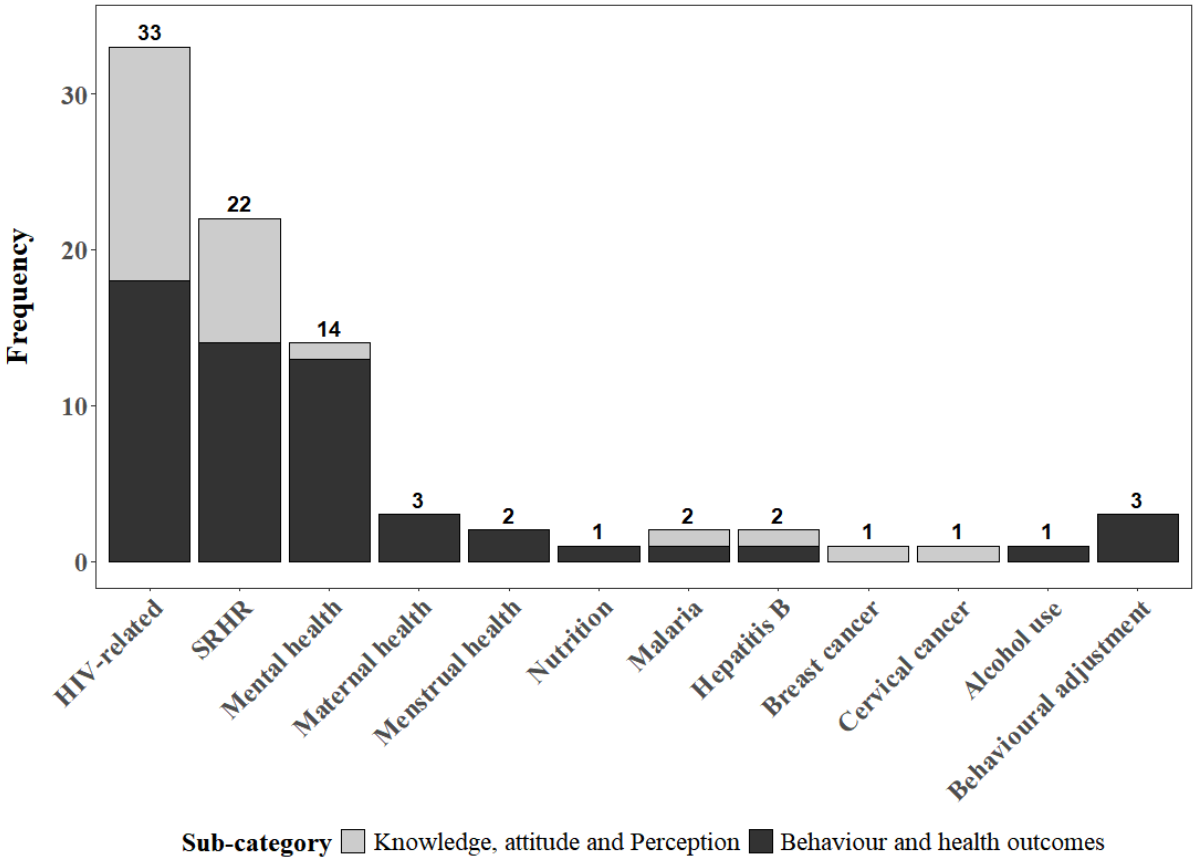

Figure 2. Outcome domains across CHW-led adolescent health interventions, by type.

Note: The count numbers are at the intervention level rather than at study level. This review also summarised evidence for the role of CHWs in adolescent well-being in Appendix I. The number of the sub-categories for well-being outcomes were as follow. Safe and supportive environments included intimate partner violence (IPV) (n= 2), child labour (n=1), child marriage (n=1), (perceived) social support from family, peers and community (n=8), gender norms (n=1), and family functioning (n=1). Connectedness included healthy relationships (n=4). Learning, education and employment included school attendance, completion and retention (n=3), literacy, numeracy and academic performance (n=4), and labour/employment and earnings (n=1). Agency and resilience included self-efficacy (n=3), self-esteem (n=2), self-worth (n=1), confidence (n=1), agency in decision-making (n=1), hope (n=1), and future orientation (n=1).

Risk of bias and Confidence in cumulative evidence

Of the 24 RCTs, 23 were rated as having a moderate risk of bias, and one was rated as having a high risk of bias, based on the JBI checklist for RCTs [99]. Among the 24 NRSIs, 12 were judged to have a high risk of bias, nine a moderate risk of bias, and three a low risk, according to the JBI checklist for NRSIs [100]. One additional NRSI involved four different settings: the two sites in Nigeria were rated as having a moderate risk of bias, while the Ethiopian and Tanzanian sites were rated as having a high risk [100]. One cross-sectional

study was evaluated as low risk using the JBI checklist for analytical cross-sectional studies [101].

We also conducted a GRADE assessment for the eight outcomes included in our meta-analysis. Certainty of evidence was rated as follows: very low for HIV knowledge; low for HIV viral load suppression; very low for knowledge and use of modern contraceptives, unmet need for contraception, and adolescent pregnancy; moderate for PTS; and low for depression. Full details of the risk-of-bias assessments and GRADE justifications were provided in Appendix H.

Data analysis

We presented vote-counting results for each outcome (see Appendix I) and reported pooled analyses in forest plots based on harmonised risk ratios or standardised mean difference when applicable. The focus of results in our review was on (i) knowledge, attitude and perception, (ii) health behaviours and outcomes and (iii) well-being, with results for well-being presented in Appendix J.

(i) Knowledge, attitude and perception

HIV-related. Fourteen studies assessed HIV-related knowledge [53,54,56,59,60,62,63,73,91,97,98], attitude [62,75,97], perception [60,97], HIV-status awareness [72,77] as well as service-related awareness [53] and attitudes [59,97]. Interventions focused primarily on education delivered through peer-education/support. A meta-analysis found no evidence for an effect on HIV knowledge (RR: 1.07; 95% CI: 0.97–1.17; I^2=76.58%; Figure 3a [59,73,91]). Evidence was mixed for attitude towards HIV (2/6 positive) [62,68,75,97] and HIV-related services (1/2 positive) [59,97], while positive effects were observed for knowledge of HIV status [72,77].

SRHR-related. Seven studies evaluated CHW-led SRHR-related interventions, mainly group-based education delivered by female or gender-matched CHWs, covering contraception, sexually transmitted infections (STIs), fertility, pregnancy, menstruation, and SRHR-service awareness. A meta-analysis found no evidence for an effect on knowledge of modern contraceptives or condom use (RR: 1.09, 95% CI: 0.99-1.19, I^2=97.99%, Figure 4a [58,73,98]). Evidence was also null for fertility knowledge [49,62] and SRHR-related services awareness[5] [58]. Attitude towards modern contraceptives and condoms was inconsistent, with mixed positive [58,66], negative [58] and null effects [58,66].

Other areas. Single studies investigated CHWs' impact on a range of additional health outcomes. These included improved mental health knowledge and emotional expression but worsened community attitude towards mental illness in Mozambique [79]; improved breast and cervical cancer knowledge in Nigeria [82,83]; no effects on hepatitis B (HB) knowledge or perceived threat in Nigeria [55]; and mixed findings in Ethiopia with gains in malaria-related preventive knowledge and attitudes and perceived vulnerability, but reduced perceived disease severity[6] [51].

(ii) Health behaviour and outcomes

HIV-related. Sixteen studies examined CHW roles in HIV-related behaviour and health outcomes, with interventions often focused on treatment support and service delivery through home visits, reminders and referrals. CHWs showed promise in HIV testing services (6/8 positive effects [60,72,81,92,93]) and viral suppression (meta-analysis of six effects [69,70,75,78,80,88]: RR: 1.16; 95% CI: 1.03, 1.31; I^2 = 45.86%; Figure 3b). Evidence was weaker for ART adherence (2/7 positive [68,75]) and linkage to and retention in care was

[5] This refers to knowledge of service location in Krug et al. (2023) [58].
[6] A counterintuitive finding that could be potentially explained by increased preventive knowledge, positive attitude changes and enhanced family support perceptions [67].

mixed (3/11 positive [68,96]). Findings on other outcomes, such as voluntary medical circumcision (VMMC) uptake [77,81] and patient satisfaction [78], showed limited and inconsistent results.

SRHR-related. Twelve unique studies assessed SRHR behaviour and health outcomes. Interventions were diverse, including education sessions (primarily peer-led), household visits (exclusively adult-led) and service delivery. Meta-analyses showed CHWs improved modern contraceptive or consistent condom use among adolescent girls (RR: 1.34, 95% CI: 1.07-1.67, I^2 = 95.25%; Figure 4b [57–60,64,67]), but had null effects on unmet need for contraception (RR: 0.94, 95% CI: 0.87–1.02, I^2 = 6.08%; Figure 4c [49,58,77]) or adolescent pregnancy (RR: 0.97, 95% CI: 0.53–1.77, I^2 = 96.07%; Figure 4d [49,77]). Vote-counting suggested more consistent benefits for menstrual product use and menstruation management [76,98], sexual self-efficacy [56,58,60] and SRH service coverage [81], whereas no effects emerged for met material need of menstrual product [76] and the number of sexual partners [60].

Mental health. Thirteen unique studies, mostly adapted CBT using group modality, examined CHWs' roles in adolescents' mental health outcomes. Meta-analyses showed strong effects in reducing trauma/stress-related symptoms (SMD: -0.83, 95% CI: −1.42, −0.24, I^2 = 96.37%; Figure 5a [74,75,84,87,89,90]) and depression (SMD −0.38, 95% CI: −0.61, −0.15, I^2 = 88.10%; Figure 5b [65,69,71,75,84,86,87,90]). Positive effects were also reported for grief (4/5 [87,90]), functional impairment (5/7 [74,85,86]), and, more modestly, emotional/behavioural symptoms (3/11 [74,87,90]).

Other areas. Two maternal health studies in Kenya and Zambia reported gains in ante-natal care (ANC) [50,95] and continuum of care [50], but no effect on skilled birth attendance [50] and mixed evidence for postnatal care [50]. In Uganda, two studies of the multifamily group programme for oppositional defiant disorder found positive effects from

both CHW and parent-peer groups, with the latter showing delayed impact [85,86]. Single studies also reported improvements in pro-social behaviour in Sierra Leone [74], dietary diversity in Ethiopia [61], and insecticide-treated bed net use [51], though no effect was observed on low/no alcohol use among Ethiopian adolescent boys [49]. In Nigeria, HB prevention practices improved across peer-led, teacher-led and co-led groups [55].

Gender analysis

Ten studies reported sex-disaggregated outcomes, revealing several interesting patterns. For instance, in Malawi, a 12-month HIV self-testing campaign increased lifetime HIV testing for both sexes, with stronger effects among boys [93]. In Nigeria, a media-based SRHR intervention with group discussions reduced gender gaps in knowledge of HIV/STI symptoms and condom use [73]. In Ethiopia, female HEWs reduced child marriage and early pregnancy among girls, reflecting their dual role as health educators and role models [49].

Thirteen studies focused exclusively on adolescent girls, covering SRHR [57,58,64,66,67,94,98], maternal care [50,95], breast [83] and cervical cancer [82], menstruation [76,98] and adolescent motherhood [71], generally showing positive but inconclusive results. No study focused solely on adolescent boys.

Three studies examined gender-matched group interventions[7], on contraceptive knowledge and use [58,64] and support for war-affected youth [74]. Nine studies used female CHWs[8] [49,52,58,66,71,82,83,98], mostly targeting girls across topics like breast [83] and

[7] Gender-matched group interventions refer to a modality in which female CHWs engage with adolescent girls, and male CHWs engage with adolescent boys. The count of gender-matched group interventions is distinct from the count of female CHW-led interventions, as the former includes both female and male CHWs.
[8] For Rudgard et al. (2022) [49] and Posso et al. (2021) [52], they studied the HEWs in Ethiopia where more than 95% of the CHW workforce are female. For Weidert et al. (2017) [94], although they did not explicitly mentioned the gender profile of their CHW workforce, the description of the selection, training and supervision of CHWs strongly suggest that the CHWs are predominantly, if not all, women.

cervical cancer [82], menstruation [98], modern contraceptives [58,66,94] and adolescent mothers [71] with mixed but largely promising outcomes.

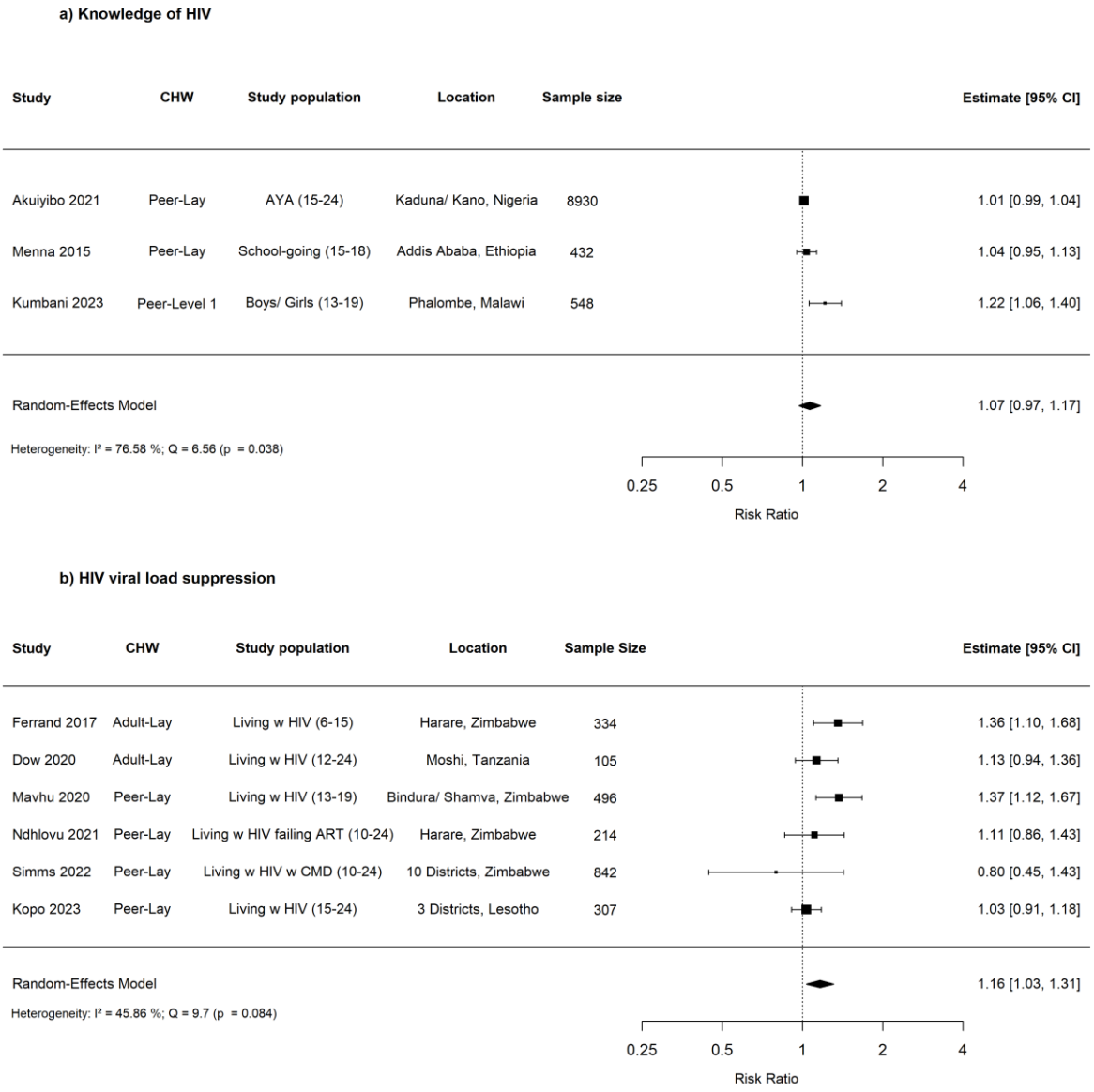

Figure 3. Forest plots: risk ratios for the effects of CHW-led interventions on (a) knowledge of HIV and (b) HIV viral load suppression among adolescents in SSA

Note:

Figure 3(a): For knowledge of HIV, of the 20 effect sizes identified, only three were included. The others were excluded due to (i) insufficient data to convert to risk ratios (e.g., missing effect sizes and/or missing standard errors) and (ii) inconsistent and/or non-standardised measurement.

Figure 3(b): For HIV viral load suppression, six of the eight identified effect sizes were included. In both Ferrand et al. (2017) [88] and Kopo et al. (2023) [78], two effect sizes were reported, but only one from each study was retained. The excluded effect size in Ferrand et al. (2017) [88] was based on a composite outcome that extended beyond viral load suppression, while the excluded effect size in Kopo et al. (2023) [78] used a cutoff of <20 copies/mL, which differed substantially from the 1,000 or 400 copies/mL thresholds applied in our analysis.

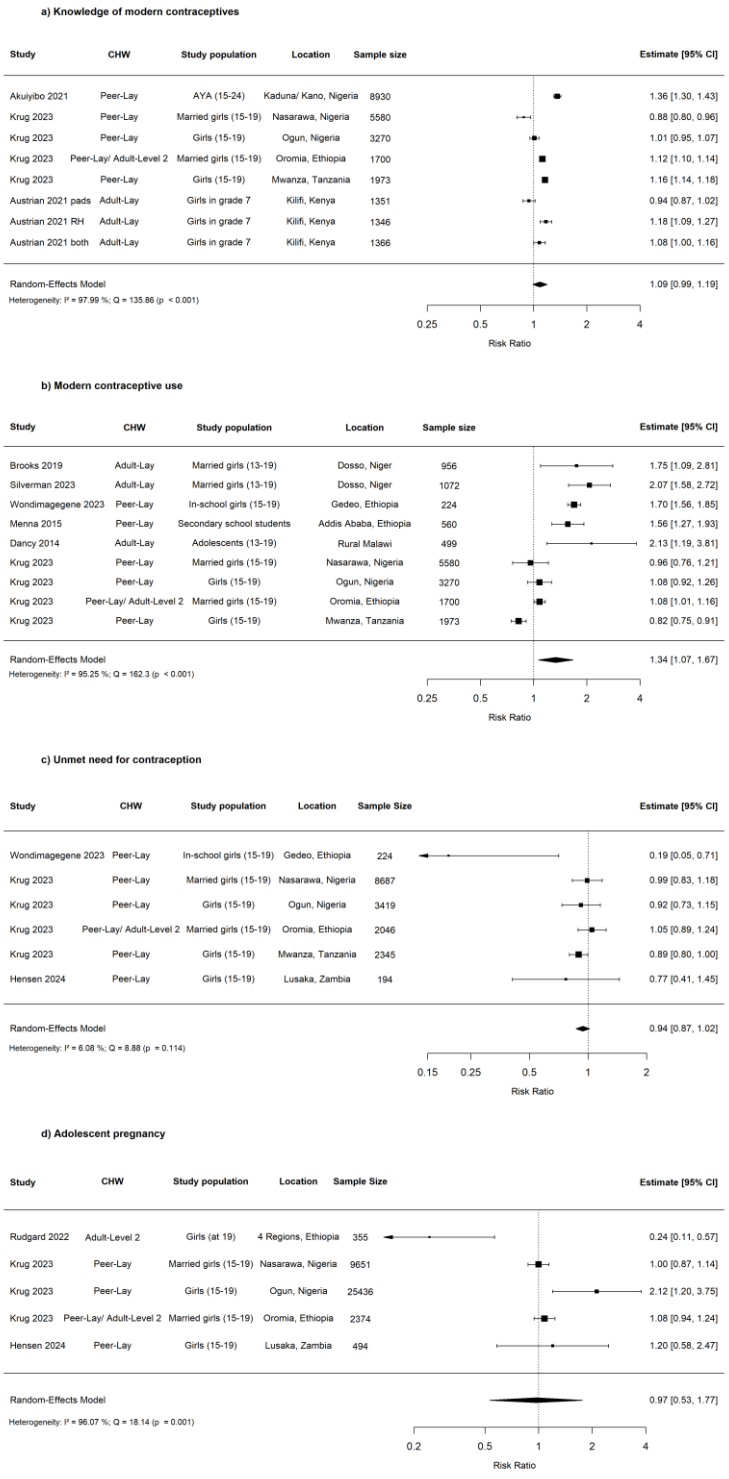

Figure 4. Forest plots: risk ratios for the effects of CHW-led interventions on (a) knowledge of modern contraceptives, (b) modern contraceptive use, (c) unmet need for modern contraceptives and (d) adolescent pregnancy among adolescents in SSA.

Note:

Figure 4(a): For knowledge of modern contraceptives, eight of 17 effect sizes were included in the meta-analysis above. We included measures like knowledge of modern contraceptives, awareness of modern contraceptives and whether one can spontaneously name a method of modern contraceptives. We excluded effect measures of knowledge of benefit of modern contraception and intention to use a modern contraceptive method.

Figure 4(b): For use of modern contraceptives, nine of 21 effect sizes were included. The other effect sizes were excluded because they only focused on a specific modern contraceptive [58,94] or they only counted "ever use" rather than "current use" or "consistent use" [58,60,77]. The effect sizes included in the meta-analysis above reflected current use of modern contraceptives or consistent condom use in the last 2 or 12 months.

Figure 4(c): For unmet need for modern contraception, all the six reported effect sizes were included in the meta-analysis above due to standard measurement.
Figure 4(d): For adolescent pregnancy, five of ten reported effect sizes were included in the meta-analysis. Four of the excluded effect sizes measured age at first birth [58]. In Hensen et al. (2023), one of the two effect sizes was excluded because it focused only on sexually active girls aged 15-19, while we included the one that considered all girls in this age group [77].

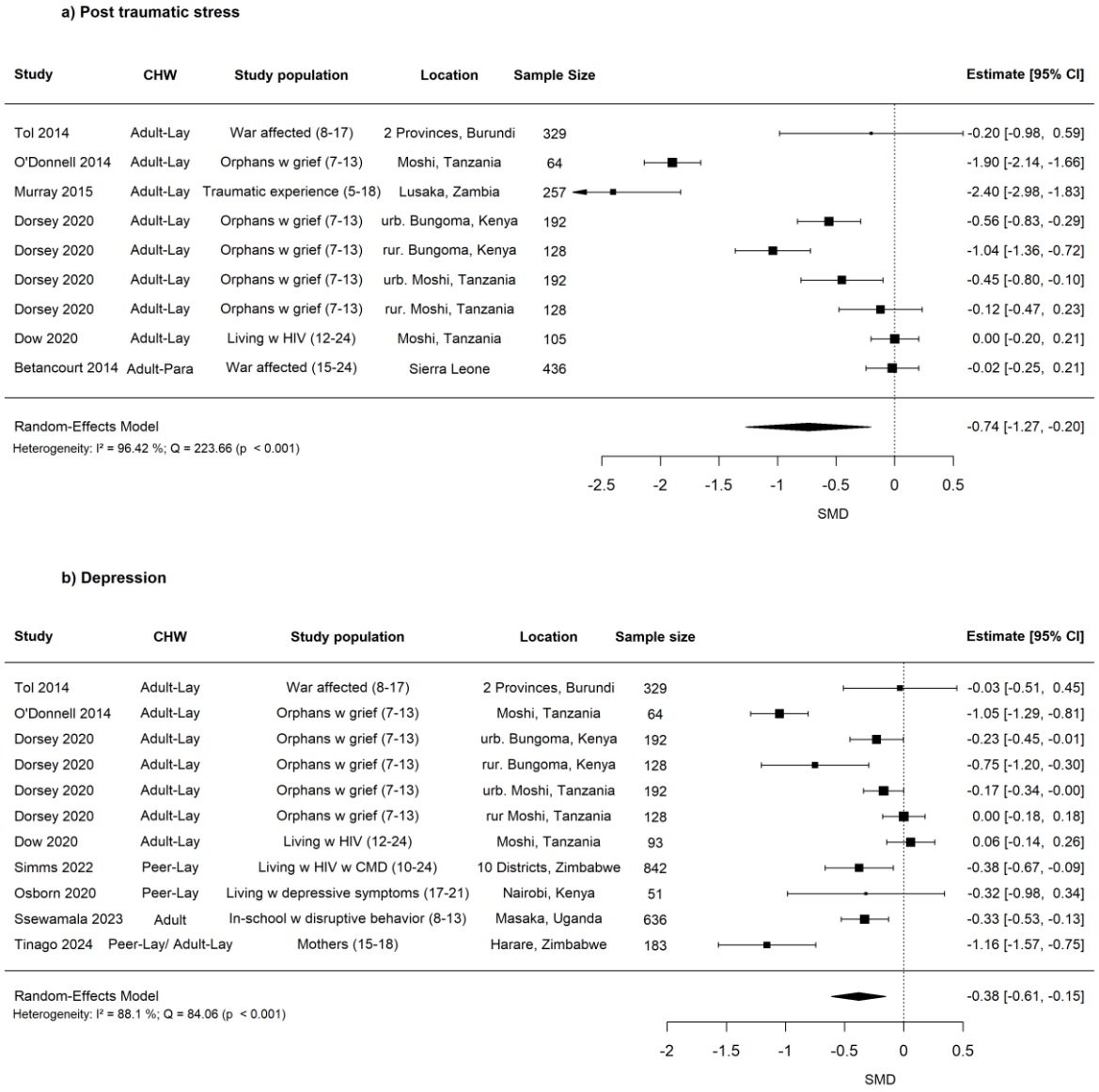

Figure 5. Forest plots: standardised mean difference (SMD) for the effects of CHW-led interventions on (a) PTS and (b) depression among adolescents in SSA.
Note:

Figure 5(a): For PTS, nine of 15 effect sizes were included in the meta-analysis above. We prioritised child self-reports over parent reports, thereby excluding five measures reported by guardian in O'Donnell et al. (2014) [87] and Dorsey et al. (2020) [90]. This decision reflects the view that internal states, such as stress and anxiety, are more accurately captured through self-report [87,90]. We also excluded one of the effect sizes reported in Betancourt et al. (2014) that measured psychological distress, but included the one that measured PTS, which is more closely related to our outcome [74].
Figure 5(b): For adolescent depression, 11 out of 17 effect sizes were included in the meta-analysis above. Same as PTS above, we prioritised child self-reports over parent reports, thereby excluding five measures reported by guardian in O'Donnell et al. (2014) [87] and Dorsey et al. (2020) [90]. This decision reflects the view that internal states, such as depression and anxiety, are more accurately captured through self-report. Additionally, one adjusted prevalence ratio assessing a binary depression outcome was excluded [70]. The effect size from the CHW treatment group was selected from

Ssewamala et al. (2023) as there was not sufficient information [86] to combine parent-peer and CHW treatment group estimates as recommended following the Cochrane guidelines [102].

Discussion

Findings and Contributions

This review provided an updated synthesis of CHW-led interventions for adolescent health over the past decade, covering diverse outcomes. Findings were promising but varied by type, intensity and context of interventions, underscoring the need for more rigorous evaluations.

We found strong evidence that task-shifting trauma-informed CBT to lay CHWs reduce PTS and depressive symptoms in adolescents, confirming and extending earlier reviews in low- and middle-income countries (LMICs) [103], particularly in Africa [104–106] with higher-quality evidence. Our adolescent-specific focus reinforces CHWs' potential to bridge mental health service gaps. CHW-led programmes, particularly Zimbabwe's Zvandiri, also improved HIV viral load suppression, though the certainty of evidence is low and replication in other contexts is needed. This extends prior reviews by focusing specifically on adolescents [107].

Evidence suggests a positive trend in modern contraceptive and condom use among adolescent girls, particularly through education-based home visits [57,64] and peer-led school education sessions [67], contrasting findings from prior reviews [108]. However, unmet need for contraception, typically defined as adolescent girls who wish to delay or avoid pregnancy but are not using contraceptives, and adolescent pregnancy rates remained unchanged, potentially highlighting gaps between demand and supply. Many interventions focused on demand creation by improving knowledge and awareness with largely consistent positive effects, such as [59,60,64,67], whereas fewer examined CHWs' direct provision and delivery of SRHR services [77,94]. Strengthening CHW provision of family-planning services,

alongside demand-side support, may better align contraceptive uptake with fertility preferences, thereby reducing unmet need and unwanted pregnancy.

Structural and cultural barriers may also shape these outcomes. Biases against premarital sexual activity discourage unmarried girls from accessing contraceptives [108], and persistently high child marriage alongside pronatalist norms[9] limit progress in reducing unmet need and pregnancy particularly among the newly married, nulliparous adolescents [15][10]. These contrasting effects might be because the pooled findings for contraceptive use versus unmet need and pregnancy derived from distinct sets of studies and contexts. Further research is needed to explain the heterogeneous impacts of CHW-led interventions across sociocultural settings, and to understand the influence of these contextual factors on the effectiveness of CHWs' activities and engagement with adolescents.

Another possible explanation is the gendered power imbalances in sexual relationships and limited self-efficacy, which can prevent girls from using contraceptives or condoms even when desired. Although some evidence suggests CHWs can improve sexual self-efficacy, findings were mixed[11]. Moreover, only one study examined CHW-led effects on power dynamics and gender norms, finding that reproductive health education addressing gender and power improved some aspects, consistent with a prior review [109], but not all, highlighting the difficulty of shifting entrenched dynamics and the potential value of broader community-level change combined with gender- and power-focused education.

Nevertheless, while demand-supply mismatches, structural and normative barriers, and relationship power dynamics plausibly explain the limited effects on unmet need and adolescent pregnancy despite gains in contraceptive uptake, the contrasting results might be

[9] Which create social expectations for early childbearing after marriage.
[10] Notably, the only included study in our review showing reduced pregnancy pointed to indirect benefits through school retention and delayed marriage [49], though more robust research is needed.
[11] Four out of seven effect sizes were positive [56,58,60], one was negative [58] and two were null [58].

just due to the very low quality of existing research, underscoring the need for more rigorous evaluations in this area.

No conclusive evidence emerged that CHWs improved adolescents' HIV or contraceptive knowledge. Most studies were low quality, often with high baseline knowledge limiting measurable gains. The HIV meta-analysis relied on only three studies and was dominated by one high-risk study lacking HIV-specific content in the intervention [73]. Contraceptive knowledge evidence was similarly mixed, with studies of moderate-to-high risk of bias and inconsistent results[12]. Baseline knowledge, ranging from 0.44 to 0.90, again suggest possible ceiling effects. While the lack of evidence on CHW's roles in improving SRHR knowledge is consistent with a prior evidence review [108], we suggest that more rigorous research is needed to assess CHWs' role in achieving further improvements in adolescents' HIV and modern contraceptive knowledge across SSA.

CHWs also appear promising in areas, such as menstruation management, nutrition, behavioural adjustment, HB and malaria prevention, though evidence is limited for firm conclusions. Moreover, research on adolescent maternal health has declined since 2014 and the focus has shifted to behaviours rather than health outcomes, but promising findings remain consistent with broader literature [24]. Safe abortion access remains unaddressed [110].

Girl-focused interventions and female CHWs often yielded positive results, especially in gendered outcomes such as menstruation management, breast and cervical cancer. Evidence on how CHW age affects intervention effectiveness in SSA remains mixed and inclusive following previous literature [111,112]. Our review could not compare peer versus

[12] There are several counterintuitive inconsistencies in the findings, which raised concerns about the validity of the results. For example, Akuiyibo et al. (2021) reported improvements in contraceptive knowledge but reductions in condom knowledge [73]. Another example is in Austrian et al. (2021), they found improvements in contraceptive knowledge among participants who received reproductive health education only, but no positive effect in the treatment group that received both reproductive health education and sanitary pad distribution [98].

adult CHW-led interventions due to limited data. Intergenerational models where CHWs of different ages work together (e.g., peer and adult CHWs in our review), seen in Ethiopia [58], Nigeria [62] and Zimbabwe [71], showed potential but lacked detailed insights into the collaboration dynamics. As such, we could not expand on the sparse literature exploring how generational factors like hierarchy and tension, noted in studies from South Africa, shape CHW delivery and outcomes [113].

Finally, it is worth noting that CHW effectiveness also depends on the design of the intervention/programme they are tasked to deliver, as well as the availability and quality of facility/hospital-based care as interventions often involved referrals and community-facility linkages (see Appendix F and G).

Future policy and research recommendations

The strongest evidence supported low-intensity psychological interventions delivered by CHWs for adolescents experiencing trauma, isolation or stigma. Scaling such models, especially for war-affected youth, adolescent mothers and adolescents living with HIV, should be a priority. Sustaining impact requires integration into national systems, clear role definitions, workload assessments, and support for CHWs' own mental health. Notably, no intervention in the past decade targeted boys or LGBTQ+ adolescents, highlighting gaps for future research and programming.

Further efforts are also needed to (i) ascertain CHWs' roles in improving adolescents' HIV viral load suppression and develop better measures for HIV treatment adherence, (ii) identify programme designs that can effectively meet adolescents' need for modern contraceptives and reduce adolescent pregnancy, (iii) clarify how CHWs influence knowledge, attitudes and perceptions among those hard-to-reach adolescents and whether these mediate health behaviour and outcomes, (iv) examine design elements (e.g., CHW

age/gender, training duration, incentives, urban/rural context) and recipient characteristics (e.g., gender, socioeconomic status) through meta-regression as more studies become available to understand how best to motivate CHWs and enhance effectiveness, (v) equip CHWs to deliver inclusive, trust-based services, especially for marginalised adolescents.

Finally, greater attention is needed on under-researched outcomes such as adolescent nutrition, non-communicable diseases and injury prevention, which are critical for shaping lifelong health [3].

Limitations

Despite its significant contributions, this review has several limitations across four main areas. First, regarding the search strategy, although comprehensive, our approach prioritised worker-related terms (e.g., peer educators, peer counsellors, peer supporters) over intervention mode-related terms (e.g., peer-led), which may have led to the omission of relevant studies that did not mention worker-specific terminology in the abstract. Second, in terms of data analysis, evidence quality posed significant challenges. Vote-counting provides limited inferential value, and meta-analyses were only feasible for eight outcomes due to inconsistent measurement and limited data. The meta-analyses relied on key assumptions that may introduce bias, including: using control group baseline risks to estimate risk ratios assumes similar covariate distributions across study groups; (even more strongly) unadjusted baseline risks[13] were used for conversion despite most studies reporting adjusted effect measures, assuming similar covariate distribution across each participant; and adjusted prevalence ratios reported in two studies [70,77] were treated as equivalent to risk ratios. Moreover, although we extracted data on programmatic variables (e.g., CHW training duration, gender and age profiles of CHW, source of support), the small number of studies

[13] Namely, the crude proportion of participants with the outcome in question.

precluded meta-regression, limiting assessment of their influence. Additionally, cost and incentive data were rarely reported, constraining assessment of financial sustainability and optimal compensation models. High heterogeneity across interventions, study methods and outcome measures further limited valid comparisons. Third, to maintain inclusivity, we incorporated many less rigorous designs, such as uncontrolled pre-post and cross-sectional, which carried a high risk of bias impeding the certainty of evidence. Finally, restricting the search to English-language publications may have excluded relevant studies, particularly from Francophone West Africa.

Conclusion

Synthesising evidence from the last decade, this review highlights the potential of CHWs to improve multiple areas of adolescent health and well-being in SSA. Strong evidence supports CHW-led CBT for adolescent mental health and CHW-led programmes for HIV viral load suppression. However, evidence remains limited across many other health domains. Our findings underscore the need to continue investing in CHWs and integrating them into national health strategies where appropriate, while ensuring future programmes are designed to optimise targeting, delivery and effectiveness, ultimately helping adolescents achieve better health and well-being.

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