Systematic Reviews

RESEARCH

Open Access

Community-based interventions against HIV-related stigma: a systematic review of evidence in Sub-Saharan Africa

Emmanuel Kimera[1*], Linda Grace Alanyo[2], Irumba Pauline[2], Maureen Andinda[1] and Enos Masereka Mirembe[2]

Abstract

Background HIV-related stigma remains a key barrier to the attainment of the UNAIDS global goal of ending AIDS by 2030. Due to the social and contextual nature of HIV-related stigma, community-based interventions may be more effective in addressing it. In this review, we synthesized evidence on the effectiveness and features of community-based interventions against HIV-related stigma in Sub-Saharan Africa.

Methods MEDLINE, EMBASE, CINAHL, Psych INFO, and Web of Science were searched in July 2023. We also searched Google Scholar and reference lists of all selected studies. Included studies were randomized controlled trials, mixed methods studies, as well as pre-test and post-test studies that evaluated the effectiveness of a community-based intervention to reduce HIV-related stigma in the general population or among specific groups. Data extraction was done using a pre-designed and pre-tested form. We performed a synthesis without meta-analysis, utilizing Fisher's method to combine *p*-values, to demonstrate evidence of an effect in at least one study. Additionally, we applied framework thematic analysis to qualitatively synthesize the intervention characteristics of the included studies.

Results A total of nine journal articles were included, largely with a high risk of bias. Results from the combined *p*-values provide strong evidence supporting the effectiveness of community-based interventions in reducing HIV-related stigma in at least one of the studies ($p < 0.001$, $X^2 = 73.1$, 18 degrees of freedom). Most studies involved people living with HIV (PLH) alone as intervention recipients and as intervention implementers. Community members with unknown HIV status were involved in only 2 studies. The intervention strategies were largely information sharing through workshops and training as well as individualized counselling. In few studies, additional support in the form of referrals, nutritional supplements, and adherence support was provided to PLH during the interventions. Most studies were judged to be of moderate to high cost except in 3 where the intervention implementers were PLH within the community, volunteering in the home-based support approach. The involvement of community members in the design of intervention strategies was not seen in all the studies.

Conclusion Community-based interventions appear to be effective in reducing HIV-related stigma. However, more robust randomized trials are needed to provide stronger evidence for this effect. Although these interventions have been multifariously developed in Sub-Saharan Africa, comprehensive strategies involving the stigmatized and the "stigmatizers" in a social change approach are lacking. The application of strategies without the involvement

*Correspondence:
Emmanuel Kimera
kimeraemma@yahoo.co.uk
Full list of author information is available at the end of the article

of community members in their design takes away a sense of community responsibility, and this threatens the sustainability of such interventions.

Systematic review registration PROSPERO CRD42023418818.

Keywords HIV, Stigma, Community-based, Intervention, Review, Sub-Saharan Africa

Background

HIV-related stigma persists as a significant barrier in the fight against HIV/AIDS and consequently the attainment of the global goal of ending AIDS by 2030 [1]. Stigma stifles disclosure of HIV status [2], adherence to antiretroviral medication [3], prevention of HIV transmission [4], and social support [5, 6]. Consequently, stigma violates the entire HIV care cascade, basic human rights, and the quality of life of people living with HIV (PLH). It is imperative to intensify actions against HIV-related stigma if the fight against the HIV pandemic of over 4 decades is to be won. Such actions should be grounded on a clear understanding of the nature and construction of stigma.

In his crucial work, Gofman defines stigma as an attribute that is deeply discreditable or discredited in society leading to a deviant persona [7]. The discreditable are those with concealable attributes such as living with HIV while the discredited possess overt traits like a physical disability and color [8]. People's experiences with stigma differ depending on the extent of concealability. PLH tend to "pass" as "normal" by concealing their stigma, yet they remain discreditable due to the high potential of being revealed [7]. Additionally, concealment of HIV occurs at high physiological and social cost [9, 10] such as distress due to heightened vigilance, inadvertent disclosures, and self-isolation. This makes HIV-related stigma unique.

The understanding of HIV-related stigma has been diversely framed by scholars. For instance, Deacon defines it as "negative things people believe about HIV/AIDS and PLH" ([11] p.6). Such beliefs reside in communities and are shaped by historical events about HIV and access to credible information as well as deliberate efforts to transform information into knowledge for communities.

For example, in many African communities, HIV and AIDS are often perceived as a result of immoral behavior and a form of punishment from God or ancestors. Earnshaw and Chaudoir argue that personal experiences and consequences of HIV-related stigma are determined by the way social mechanisms of HIV/AIDS impact individuals including those without HIV/AIDS [12]. In their model, HIV/AIDS is a socially devalued attribute that evokes peoples' reactions whenever it emerges. For people without HIV, their awareness that PLH exist threatens their health, and may possess moral blemishes [13], and evokes prejudice, stereotypes, and discrimination leading to enacted stigma. Those with HIV react due to the awareness that they are social deviants who may have violated social morals and are thus subject to other peoples' disapproval and negative treatment. They therefore experience internalized and anticipated stigma.

HIV-related stigma emerges through social endorsement of the diminished status of PLH, and it is manifested through discounting, discrediting, and discriminating of such people and their associates [14]. Current literature points to fear of infection, lack of basic HIV/AIDS knowledge, and socio-cultural beliefs as key drivers of HIV-related stigma [15, 16]. Also, context-specific belief systems on HIV/AIDS sprout and propagate negative attitudes and disvaluing social behaviors. Therefore HIV-related stigma varies across social contexts necessitating reparation for it to be contextual. Due to its multifaceted and multilevel nature, fighting HIV-related stigma requires wholistic interventions that cover a broad array of community-specific aspects to create fundamental shifts in knowledge, attitudes, and behavior.

Community-based interventions have recently gained prominence in the fight against HIV-related stigma. Such interventions are based on the rationale that stigmatizing beliefs, attitudes, and practices arise from social interactions within particular settings, and they should be addressed similarly. Additionally, interventions ought to focus on both the stigmatized and the "stigmatizers" for the different shades of stigma to be addressed. However, for the effective design of wholistic community-based interventions, different actions ought to be integrated. This is only possible if different effective community actions are identified. In this study, we synthesized evidence on features of community-based interventions that have been reported as effective in the reduction of HIV-related stigma. This will act as a knowledgebase for designing effective interventions against HIV-related stigma in the context of Sub-Saharan Africa where HIV remains a significant public health challenge. This review thus answered the question, How effective are community-based interventions against HIV-related stigma and what are the key features of such interventions?

Methods

We followed Cochrane guidelines for systematic reviews and meta-analysis [17] and the updated Preferred Reporting Items of Systematic Reviews and Meta-analysis (PRISMA) statement of 2020 [18]. The review protocol was developed and registered with the International Prospective Register of Systematic Reviews (PROSPERO), registration number CRD42023418818.

Search strategy

We formulated a comprehensive search strategy for PubMed, EMBASE, CINAHL, Psych INFO, and Web of Science databases. We used the Cochrane HIV/AIDS collaboration search string for HIV/AIDS AND our developed strings of community OR similar AND intervention OR similar AND stigma OR similar (see additional file 1 for search strategy used in PubMed). Database searches were conducted in July and August 2023 by the first author (EK). EK created monthly email alerts in each database to be notified of new studies that conformed to the search strategy. By the time this manuscript was submitted, no new study merited inclusion. Reference lists of selected studies were also checked by EK to detect other eligible studies using the same inclusion and exclusion criteria.

Inclusion and exclusion criteria

Included studies were published randomized controlled trials, quasi experimental studies, and pre-test and post-test studies that evaluated the effectiveness of a community-based intervention to reduce HIV-related stigma in the general population or among specific groups. We included specific or general intervention campaigns such as behavioral, educational, and socio-economic actions targeted at a population level or at specific groups within a defined local community [19] with the aim of reducing HIV-related stigma as one of the outcomes. We were cognizant of the various representations of HIV-related stigma informed by several studies we have conducted on the topic [20–22]. Terms like "negative attitude," stereotyping, prejudice, mistreatment, discrimination, and isolation were thus included in the search. Studies were excluded if (1) they did not clearly indicate the target population and (2) the effectiveness was assessed qualitatively.

Study selection and data extraction

All search results from databases were imported into a reference management software, Zotero standalone, and duplicates were removed. EK initially scanned through the titles and abstracts to eliminate studies that were obviously irrelevant to the review. IP and AM, working independently, then applied the inclusion and exclusion criteria to full text of all remaining references to obtain the eligible studies. They met after selecting eligible studies to compare their selection. Disagreements were resolved by consensus with the involvement of another reviewer, EM. A pre-designed data extraction sheet for each selected study was completed by two reviewers AM and LA, working independently. Extracted data included the following information: study details (area/settings, citation, design, data collection methods, and analysis), participant details (age, sex, occupation, category), intervention details, and outcome details (Tables 1 and 2). After data extraction, AM and LA met to compare their data, and discrepancies were resolved by consensus involving a third reviewer (EM).

Outcomes and measures

The primary outcome measured was the change in HIV-related stigma, defined as a reduction in negative beliefs, attitudes, and discriminatory behaviors toward people living with HIV or an increase in positive attitudes toward them. We included all types of stigma, such as internalized, anticipated, and enacted stigma. The studies utilized various stigma assessment scales to evaluate these changes.

Data analysis

Due to methodological and clinical heterogeneity in the included studies, we could not undertake a meta-analysis. We thus conducted synthesis without meta-analysis. For the quantitative data, the absence of effect estimates or sufficient data to calculate them precluded summarizing effect estimates from included studies. We followed Fisher's method to combine p-values in order to determine if there is evidence of an effect in at least one study. Using one-sided p-values, we calculated the chi-square statistic with 18 degrees of freedom to test the hypothesis that there is no evidence of an effect in at least one study. The associated p-value was obtained using a command = CHIDIST(X^2 value, df) in an Excel spreadsheet. A visual display of the statistical data of included studies is presented in the albatross plot (Fig. 2).

Framework analysis was also used to synthesize the main features of interventions described in the included studies. A priori framework of thematic categories was developed by all authors based on the research question and some constructs in the first domain of the Consolidated Framework of Implementation Research (CFIR) called intervention characteristics [32]. The CFIR provides a comprehensive framework of constructs to guide successful implementation and evaluation of interventions. The main features of interventions are reported in

Table 1 Characteristics of included studies

Citation/location/settings	Participants	Study design	Description of intervention	Data analysis method	Aim/purpose of study	Outcomes (effect on HIV-related stigma, effect size, and *p*-value	Risk of bias
Chao et al. 2010/KwaZulu-Natal, South Africa/schools	120 educators (teachers), males and females, age Not explicitly stated	Pre-post-test design	An interactive CD-ROM on computer (actor playing the role of a pupil afflicted with AIDS and the use of the interactive nature of the CD-ROM to teach teachers how to deal with various situations)	Wilcoxon signed rank statistics	To examine the HIV-related stigma attitudes among 120 educators	The overall composite HIV stigma scores decreased by an average of 1.69 points after the intervention, which was also statistically significant ($p < .01$ by Wilcoxon signed-rank test)	Critical risk
Ferris et al. 2019/Zimbabwe/community	23 people (17 females) of 41 years average age	Sequential explanatory mixed methods with pre-test and post-test design	A 2-day workshop on care and support with role play to empower teachers deal with HIV situations and included HIV transmission, risk factors, and actions that educators should know and undertake. All interventions though different involved provision of detailed information about HIV	Changes in scores between baseline and 1-and 3-month follow-up were analyzed using the Wilcoxon matched-pairs signed rank test. As a measure of effect size, r was calculated based on the *Z*-value of the Wilcoxon test	To examine the potential role of the IBSR intervention in helping people living with HIV to overcome self-stigma and associated states	Participants reported significant improvements in self-stigma (3-month follow-up vs baseline $Z = 3.0$, $p = 0.003$, $n = 23$)	Moderate risk
Lifson et al. 2023/Rural Ethiopia/community	1799 People living with HIV, both male and female, with median age of 30 years	Cluster randomized trial	People living with HIV were assigned a Community Social Worker (CSW) living with HIV. CSWs provided health education on ART adherence. CSWs also provide personal counselling and social support. CSWs met with clients in the community weekly for the first 3 months and then 2–4 times per month as clients became more stable	Treatment effects (TE), the estimated difference between intervention and control arms, were calculated using linear mixed-effects regression models. Repeated outcomes were included for each individual (12, 24, and 36 months) adjusted for baseline scores	1. To evaluate whether individual CSWs provided to HIV patients newly entering care would improve retention in care over a 36-month follow-up period 2. To assess whether having such HIV patients assigned to an individual CSW would lead to emotional health benefits, including an improved sense of social support, and reduced feelings of depression and internalized stigma	Mean internalized stigma scores decreased in intervention compared to control participants. The greatest decrease in the intervention group was from baseline to 12 months, from 4.3 to 1.5, (−2.9, 95% CI −5.1, −0.8)	some concerns

Table 1 (continued)

Citation/location/settings	Participants	Study design	Description of intervention	Data analysis method	Aim/purpose of study	Outcomes (effect on HIV-related stigma, effect size, and *p*-value	Risk of bias
Chidrawi et al. 2014/North-West Province in South Africa/urban and rural areas	18 people living with HIV (14 females), aged over 18 years	Pre-post-test design	A two-day lecture and activity-based workshop for PLWH in both urban and rural settings, which focused on their personal and personal strengths identification, followed by a series of six three-day workshops attended by all PLWH and particular people living close to them from six designated groupings (spouses/partners, a child over 15 for each PLWH, a family member, a friend, a spiritual leader and a community member for all PLWH. Activity-based group-workshops for PLWH and people close to them focused on an understanding of HIV stigma and coping with it, as well as the relationships among them. The second day focused on learning how to plan a project for HIV stigma reduction in their own community	A change in HIV stigma experiences of PLWH as a result of the intervention was measured on the "Validation of the HIV/AIDS stigma instrument PLWA (HASI-P)" for PLWH. Effect sizes were calculated for analysis of practical significance in cases where the limited number of PLWH offered little statistical power to indicate statistical significance. understanding of HIV stigma, responsible disclosure management	To observe change in the HIV stigma experiences and health behavior of PLWH after a comprehensive community-based HIV stigma reduction intervention	The total stigma score as calculated from the different subscales indicates a statistically significant ($p=0.02$) improvement over time in the HIV stigma experiences of the PLWH, as well as a practical significance with effect sizes larger than 0.50	Critical risk

Table 1 (continued)

Citation/location/settings	Participants	Study design	Description of intervention	Data analysis method	Aim/purpose of study	Outcomes (effect on HIV-related stigma, effect size, and *p*-value	Risk of bias
Low et al. 2013/western Kenya/rural households	2700 households with 45 years average age for intervention and control, 313 community leader with 49.4 years average age	Cluster randomized trial	Home-Based Counselling and Testing (HBCT) was implemented in the intervention group. The HBCT program began with a community sensitization program in which facilitators, usually drawn from the local community, worked with local government officials to explain the program to the community. Next, locally based counselors visited all of the households in the community to provide voluntary HIV counselling and testing to all consenting adults in a given household. Control group was deferred implementation of HBCT. These tests and the associated counseling were administered within the household, and couples were encouraged to test together. Individuals who tested positive for HIV were referred to the local treatment facilities administered by AMPATH for appropriate treatment	*t*-tests were performed on the differences between these two groups. For some outcomes, regression analysis that includes an intervention indicator variable as well as a number of covariates was performed. All analyses were conducted using Stata version 10.0	1. Can HBCT be successfully implemented and achieve high levels of testing uptake in the presence of stigma? 2. What is the impact of HBCT on the levels of perceived community stigma and levels of self-stigma? 3. What is the impact of HBCT, which includes community leader education and mobilization, on community leaders' knowledge, attitudes, and behaviors with regard to HIV?	There was no significant effect of the intervention on the different indices of HIV stigma	some concerns

Table 1 (continued)

Citation/location/settings	Participants	Study design	Description of intervention	Data analysis method	Aim/purpose of study	Outcomes (effect on HIV-related stigma, effect size, and *p*-value	Risk of bias
Masquillier et al. 2015/ South Africa/households	630 PLWHA, both males and females, 18 years and above, and 38.97 years average age	Utilized secondary data from a Randomized controlled trial	Patients recruited into the study were randomly assigned to a control group or to a group who received additional peer adherence support and an additional nutrition support. Subjects were enrolled in the intervention for 11.7 months on average. Patients received an average of 7.6 visits from the peer adherence supporter each month. The peer adherence supporters were PLWHA who had been on ART for at least 12 months. Visits from peer adherence supporters took place at times and locations chosen by the ART patients receiving the support, whether at home, work or elsewhere. When visiting the patient, the peer adherence supporter provided help with adherence and discussed any reasons why this could be difficult, such as stigma. They identified possible ART side effects and took action as appropriate. When necessary, the patient was referred to the clinic. Other topics, such as unemployment benefits or pensions, were also discussed		1. To determine whether peer adherence support (PAS) and treatment buddying influence the stigma experienced by PLWHA 2. To analyze the interrelationships between each support form and stigma	Results indicate that having a treatment buddy decreases felt stigma scores, while receiving PAS increases levels of felt stigma at the second follow up. However, the PAS intervention was also found to have a positive influence on having a treatment buddy at this time. Furthermore, a treatment buddy mitigates the stigmatizing effect of PAS, resulting in a small negative indirect effect on stigma	High risk

Table 1 (continued)

Citation/location/settings	Participants	Study design	Description of intervention	Data analysis method	Aim/purpose of study	Outcomes (effect on HIV-related stigma, effect size, and *p*-value	Risk of bias
Norr et al. 2007/Malawi/schools	328 teachers pre-test, 318 post-test, both males and females	pre-test/post-test design	The intervention was called Mzake ndi Mzake (Friend-to-Friend), and it contained six 2-h sessions The sessions covered information on the need for HIV prevention and stigma reduction, sexuality and sexually transmitted diseases; HIV transmission, prevention and testing, condom facts, values, and correct use, negotiating for safer sex with a partner; and, promoting community HIV prevention. Skill-building exercises to enhance self-efficacy for behavioral change, such as role plays and return demonstrations Peer groups were formed and then each of the peer groups selected two group members to facilitate the peer group sessions. Those volunteer facilitators received a day-long training session by the project team. First, they were participants in all six sessions facilitated by the research team; then they gave return demonstrations of selected parts of the sessions, using other trainees as the peer group. The trainers and other trainees provided feedback to help improve their group facilitation skills. Each peer leader then received a manual to use in their respective peer groups for training	Analyses used paired t-tests of the pre-and post-test matched samples. Percentage differences were tested using chi-square tests, and means were tested using *t*-tests. Two-tailed tests were used for the items gauging perceived risk. One-tailed tests of significance were used for all other outcomes, with the expectation that outcomes would be more favorable at the post-test	To assess if a peer group intervention for teacher trainees would result in increased HIV-prevention-related knowledge, more favorable attitudes for HIV prevention (including more positive attitudes to condom use), greater self-efficacy to change behaviors, and increased safe-sex behaviors	At the time of the post-test the teachers expressed less agreement with stigmatizing attitudes, as gauged in four of the six items. They were significantly less likely to say AIDS is a punishment from God or a disgrace to the family ($p < 0.05$), and significantly more likely to agree that persons living with HIV should tell their family and friends or their partners ($p < 0.01$)	Moderate risk

Table 1 (continued)

Citation/location/settings	Participants	Study design	Description of intervention	Data analysis method	Aim/purpose of study	Outcomes (effect on HIV-related stigma, effect size, and *p*-value	Risk of bias
Nyandiko et al. 2023/ western Kenya/primary and secondary schools	330 participants including 311 teachers, mean age 36.41 years and 19 adolescents living with HIV with mean age 16.37 years	Cluster randomized trial	Teachers from intervention schools underwent HIV stigma-focused training using the TeachHADITHI Module. The intervention (TeachHADITHI module) included lecture presentations, narrative films featuring the stories of ALWH, an educational animation, teacher role-play scenarios, and a question-and-answer session facilitated by a trained ALWH peer educator. All teachers in the intervention schools received the same training, written and facilitated at the primary school language level, regardless of school level	The study compared means of participants' characteristics and baseline outcomes by intervention assignment using two-sided *t*-tests	To assess whether a locally developed, multi-media teacher-training intervention altered negative HIV-related Knowledge/ Attitude/Beliefs and HIV stigma among primary and secondary school teachers in western Kenya	A small decrease in overall stigma score that is not statistically significant. Effect size -0.018, CI − 0.082, 0.045	High risk
Willis et.al. 2019/Rural Zimbabwe/homes	94 adolescents, living with HIV, both male and female aged 10–15 years	Randomized Trial	Participants were allocated to one of the 9 trained and mentored CATS for additional support which included a weekly home visit. The CATS provided HIV and ART information and counselling. They also monitored adherence and well-being. In case of difficult in adherence and health, the CATS referred participants to a CATS mentor in their district. CATS additionally provided caregivers with information regarding referral for other services such as social welfare. All the 9 CATS attended a weekly feedback meeting with the CATS mentor at the clinic	Data from the baseline, quarterly and twelve-month surveys was analyzed using descriptive statistics (proportions, means or point system with 4 being highest while 0 was least) and odds ratios to provide evidence of effectiveness of the CATS intervention on improving linkages and retention, adherence and psychosocial well-being	To determine the effectiveness of CATS services on improving linkage to services and retention in care, adherence, and psychosocial well-being among adolescents living with HIV in Zimbabwe	The intervention group reported a decline in stigma, though it was not statistically significant ($p = 0.848$). The control group, however, experienced a statistically significant increase in stigma levels ($p = 0.01$)	some concerns

Table 2 Outcome summaries

Study	Study design	Intervention	Sample size and participants	Duration of the intervention	Significance level	Direction of effect
[23] Chao et al. 2010	Pre-test-post-test design	An interactive CD-ROM on computer (actor playing the role of a pupil afflicted with AIDS and the use of the interactive nature of the CD-ROM to teach teachers how to deal with various situations)	120 teachers	Not reported	*p* less than 0.01	Decreased stigma
[24] Ferris et al. 2019	Pre-test-post-test design	A 2-day workshop on care and support with role play to empower teachers deal with HIV situations and included HIV transmission, risk factors, and actions that educators should know and undertake. All interventions though different involved provision of detailed information about HIV	23 people	6 months	$p = 0.039$	Decreased self-stigma
[25] Lifson et al. 2023	Randomized trial	People living with HIV were assigned a Community Social Worker (CSW) living with HIV. CSWs provided health education on ART adherence. CSWs also provide personal counselling and social support. CSWs met with clients in the community weekly for the first 3 months and then 2–4 times per month as clients became more stable	1799 people living with HIV	36 months	CI – 6.6 to – 0.5	Decreased internalized stigma

Table 2 (continued)

Study	Study design	Intervention	Sample size and participants	Duration of the intervention	Significance level	Direction of effect
[26] Chidrawi et al. 2014	Pre-test-post-test design	A 2-day lecture and activity-based workshop for PLWH in both urban and rural settings, which focused on their personal and personal strength identification, followed by a series of six 3-day workshops attended by all PLWH and particular people living close to them from six designated groupings (spouses/partners, a child over 15 for each PLWH, a family member, a friend, a spiritual leader and a community member for all PLWH. Activity-based group workshops for PLWH and people close to them focused on an understanding of HIV stigma and coping with it, as well as the relationships among them. The second day focused on learning how to plan a project for HIV stigma reduction in their own community	18 people living with HIV	12 months	$p=0.02$	Decrease in HIV stigma
[27] Low et al. 2013	Randomized trial	Home-Based Counselling and Testing (HBCT) was implemented in the intervention group. The HBCT program began with a community sensitization program in which facilitators, usually drawn from the local community, worked with local government officials to explain the program to the community. Next, locally based counselors visited all of the households in the community to provide voluntary HIV counselling and testing to all consenting adults in a given household. Control group was deferred implementation of HBCT. These tests and the associated counseling were administered within the household, and couples were encouraged to test together. Individuals who tested positive for HIV were referred to the local treatment facilities administered by AMPATH for appropriate treatment	2700 household heads and 313 community leaders	18 months	$p=0.01$	Decreased enacted stigma

Table 2 (continued)

Study	Study design	Intervention	Sample size and participants	Duration of the intervention	Significance level	Direction of effect
[28] Masquillier et al. 2015	Randomized controlled trial	Patients recruited into the study were randomly assigned to a control group or to a group who received additional peer adherence support and an additional nutrition support. Subjects were enrolled in the intervention for 11.7 months on average. Patients received an average of 7.6 visits from the peer adherence supporter each month. The peer adherence supporters were PLWHA who had been on ART for at least 12 months. Visits from peer adherence supporters took place at times and locations chosen by the ART patients receiving the support, whether at home, work, or elsewhere. When visiting the patient, the peer adherence supporter provided help with adherence and discussed any reasons why this could be difficult, such as stigma. They identified possible ART side effects and took action as appropriate. When necessary, the patient was referred to the clinic. Other topics, such as unemployment benefits or pensions, were also discussed	630 people living with HIV	12 months	$p = 0.042$	Decreases internalized stigma

Table 2 (continued)

Study	Study design	Intervention	Sample size and participants	Duration of the intervention	Significance level	Direction of effect
[29] Norr et al. 2007	Pre-test-post-test design	The intervention was called Mzake ndi Mzake (Friend-to-Friend), and it contained six 2-h sessions The sessions covered information on the need for HIV prevention and stigma reduction, sexuality and sexually transmitted diseases; HIV transmission, prevention, and testing, condom facts, values, and correct use, negotiating for safer sex with a partner; and, promoting community HIV prevention. Skill-building exercises to enhance self-efficacy for behavioral change, such as role plays and return demonstrations Peer groups were formed and then each of the peer groups selected two group members to facilitate the peer group sessions. Those volunteer facilitators received a day-long training session by the project team. First they were participants in all six sessions facilitated by the research team; then they gave return demonstrations of selected parts of the sessions, using other trainees as the peer group. The trainers and other trainees provided feedback to help improve their group facilitation skills. Each peer leader then received a manual to use in their respective peer groups for training	328 teachers	Not reported	*p* less than 0.01	Decreased stigma

Table 2 (continued)

Study	Study design	Intervention	Sample size and participants	Duration of the intervention	Significance level	Direction of effect
[30] Nyandiko et al. 2023	Randomized trial	Teachers from intervention schools underwent HIV stigma-focused training using the TeachHADITHI Module. The intervention(TeachHADITHI module) included lecture presentations, narrative films featuring the stories of ALWH, an educational animation, teacher role-play scenarios, and a question-and-answer session facilitated by a trained ALWH peer educator. All teachers in the intervention schools received the same training, written and facilitated at the primary school language level, regardless of school level	330 participants (teachers and adolescents living with HIV	6 months	CI – 0.082 to 0.045	No significant effect
[31] Willis et.al. 2019	Randomized controlled trial	Participants were allocated to one of the 9 trained and mentored CATS for additional support which included a weekly home visit. The CATS provided HIV and ART information and counselling. They also monitored adherence and well-being. In case of difficult in adherence and health, the CATS referred participants to a CATS mentor in their district. CATS additionally provided caregivers with information regarding referral for other services such as social welfare. All the 9 CATS attended a weekly feedback meeting with the CATS mentor at the clinic	94 adolescents living with HIV	12 months	$p = 0.848$	No significant effect

3 deductive thematic categories: actors in the interventions, intervention processes, as well as costs and sustainability of the intervention.

Assessment of quality of evidence

Included studies are of 2 categories and separate Cochrane Risk of Bias (RoB) tools [33] were used for each category. The Risk of Bias 2 (RoB-2) was used to assess RoB in randomized controlled trials, while Risk of Bias in Non-Randomized Studies 1 (ROBINS-I) was used for non-randomized trials of interventions. The assessment was based on 3 grades for the randomized controlled trials: low risk of bias, moderate risk of bias, and high risk of bias. For non-randomized trials of interventions, three grades, low risk, moderate risk, and critical risk, were used. The online Risk of Bias Visualization (RoBvis) tool was used to visualize the assessment results for each study in all assessment domains. Two reviewers EM and LA worked independently to assess the RoB.

Results

Search results

A total of 1067 titles were obtained, 1065 from searching of electronic databases and 2 titles from searching reference lists of eligible studies. After removing 568 duplicate titles, 499 titles were left for screening. The screening of titles and abstracts eliminated 487 titles leaving 12 titles for full-text assessment of eligibility. Full text of the 12 articles was obtained and printed out for thorough reading to assess eligibility, guided by the pre-set inclusion and exclusion criteria. At this stage, 3 articles were found ineligible. We therefore included 9 studies in the systematic review and none in the meta-analysis. Figure 1 below shows the study selection process.

Description of included studies

Study location and settings

Three of the included studies were conducted in South Africa [23, 26, 28], two in Zimbabwe [24, 31], two in

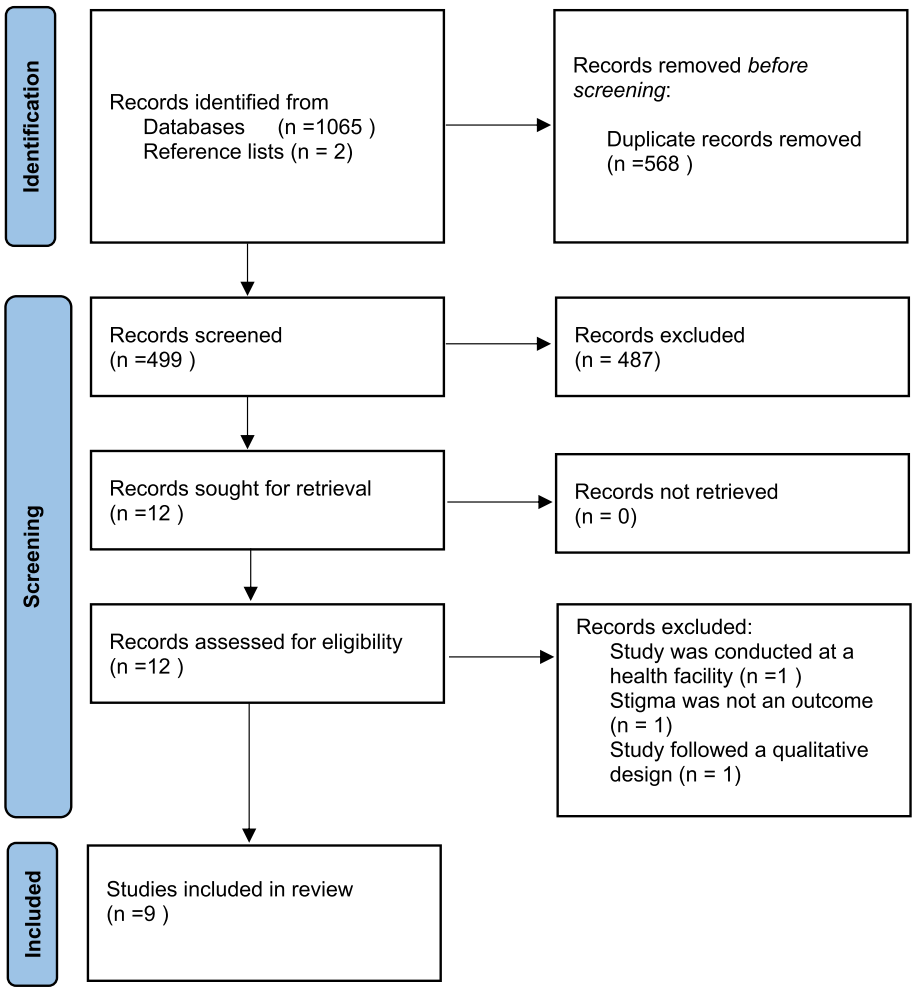

Fig. 1 Study flow diagram

Kenya [27, 30], one in Ethiopia [25], and one in Malawi [29]. All studies were conducted within the community but in different settings. Four studies were conducted in homes of people living with HIV [25, 27, 28, 31], three in schools [23, 29, 30], and two in unspecified settings within the community [24, 26].

Study design and participants

Studies employed 3 different designs: a randomized controlled trial design was used in 5 studies [25, 27, 28, 30, 31], a pre-test and post-test design in three [23, 26, 29], and mixed methods in one [24]. Studies involved both male and female participants of various categories. People living with HIV (PLH) were involved in 6 studies [24–26, 28, 30, 31]. Among the 6 studies that involved PLH, 2 reported involving adolescents [30, 31]. Educators/teachers were involved in three studies [23, 29, 30].

Characteristics of included studies

Intervention characteristics

Key features of interventions are reported in 3 major themes that were developed during the analysis. These are described below.

Actors and sites of interventions

We categorized actors in interventions as implementers and intervention recipients. Studies reported varying categories of individuals in both groups. In 4 studies [25, 28, 30, 31], the implementers were known to be living with HIV and thus acted as peer supporters/mentors [28, 31], community social workers [25], and volunteers [30]. In 4 studies, the HIV status of implementers was not explicitly stated [23, 24, 27, 29]. These included community members [27] and teachers [23, 29, 30]. In one study [26], PLH and those whose status was unknown were involved as intervention implementers.

Intervention recipients also varied across studies. Four studies focused exclusively on PLH [24, 25, 28, 31], while others included both PLH and individuals with unknown HIV status [26, 30]. Additionally, some studies targeted only individuals with unknown HIV status [23, 27, 29]. The study by Chindrawi et al. [26] involved PLH and people living close (PLC) to them. The PLCs were spouses/partners, children of PLH, family members, friends, religious leaders, and community members. In 3 studies [23, 29, 30], schoolteachers were the intervention recipients, while in another study [27], all consenting adults in households were targeted.

Although all included studies were categorized as community-based, they were conducted under different settings. Three studies were conducted in educational institutions, that is teacher training colleges [29] as well as primary and secondary schools [23, 30]. Four studies were conducted in households [25, 27, 28, 31], and 2 were not explicit on the exact settings within the community [24, 26].

Intervention processes

Interventions reported in the included studies involved a variety of actions and interactions by the various actors described in the preceding theme. All interventions involved information sharing through different fora in the form of individual sessions or group sessions or both. In 2 studies, information sharing occurred through workshops and lectures [24, 26]. In one study [23], simulations of a person living with HIV were done through a digital platform using a compact disc read-only memory (CD-ROM) computer program and roleplay without direct contact with PLH. This was to build capacity of teachers to act as mentors and be able to address HIV-related issues within school and classroom settings. The study by Chidrawi et al. [26] involved workshops and lectures involving PLH and PLC to improve interactions between them, the understanding of HIV stigma, and the management of disclosure. Ferris France et al. [24] involved the intervention team working with PLH to address self-stigmatizing beliefs through face-to-face workshops, remote classes, and self-inquiry, as well as peer and mentor methods. In one school-based study [30], teachers underwent a multi-media HIV-stigma focused training.

Individualized counselling, health education, and other forms of social support including referrals to healthcare facilities for management of emerging health issues were reported in 5 studies [25, 27–29, 31]. The intervention by Lifson et al. [25] involved community social workers (CSW) who visited PLH and offered the intervention package, while for Low et al. [27], the same was delivered through the home-based counselling and testing program for all consenting adults. The intervention by Masquillier et al. [28] involved the provision of nutritional supplements during the visits to PLH, in addition to the counselling and other support. The one-on-one (friend-to-friend) intervention by Norr et al. [29] involved peer sessions covering various topics including HIV stigma. In the study by Willis et al. [31], community adolescent treatment supporters provided counselling to adolescents living with HIV in addition to monitoring their adherence to antiretroviral therapy and general well-being.

Cost and sustainability of interventions

Studies were not explicit on the cost of the interventions and how interventions would be sustained. We thus devised a framework to assess the cost of the interventions and their likelihood to be sustained by the community members. Four criteria were used to make judgement: number of people involved, level of motivation/incentive to engage in the intervention,

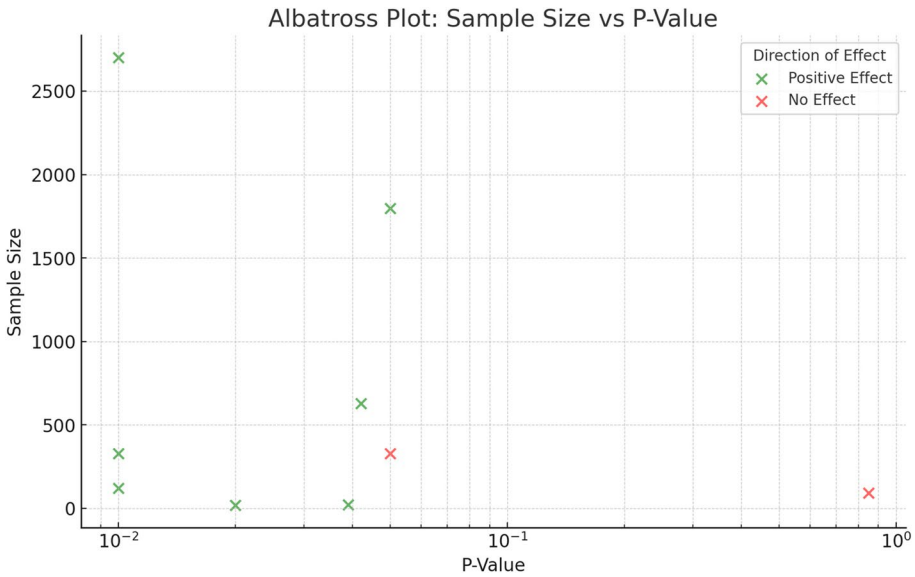

Fig. 2 Statistical data of included studies

and procurable tools used. Based on these, interventions were judged as low cost and sustainable, moderate cost and likely to be sustained, as well as high cost and unsustainable.

Interventions in three studies [25, 28, 31] were judged low cost and sustainable. These involved few individuals (PLH working with community social workers/peer adherence supporters/community adolescent treatment supporters) at household level. The one-on-one interaction would lead to a sense of accountability and individualized responsibility for continuity.

Four interventions [23, 24, 27, 30] were found to be of moderate cost and likely to be sustained. Costs were deduced from the purchase of computers/television sets and associated repairs for interactive digital media [23, 30], workshops for teachers in schools [24], and community-wide sensitization for home-based testing and counselling [27]. These also involved more people with the likelihood of self-propagation.

The intervention by Chindrawi et al. [26] was judged to be of high cost and less likely to be sustained. This intervention involved trainings, lectures, and workshops with varied groups of people (PLH and people close to them). Although it required different groups of people living close to PLH to develop their own strategies, we judged that their motivation to do so would be less likely and the intervention would not be sustained.

Outcomes

Effect of intervention and direction of effect

Most studies [23, 24, 26–28, 30, 31] reported a positive effect of the intervention, defined here as a reduction in HIV-related stigma. Only two studies [25, 29] found no significant effect. Using Fisher's method to combine the one-sided *p*-values from the included studies yielded a chi-square statistic of 73.1 with 18 degrees of freedom, resulting in a *p*-value of less than 0.001. This indicates a significant effect and supports rejecting the null hypothesis. The intervention thus caused a significant effect in decreasing HIV-related stigma in at least one of the studies.

The albatross plot (Fig. 2) shows that although the interventions in most studies [23, 24, 26–28, 30, 31] had a positive effect on HIV-related stigma, they involved generally small sample sizes and thus less powerful. The studies with larger sample sizes [28, 31] had lower *p*-values, which suggests more statistically significant results.

Results for assessment of quality of evidence

Risk of bias for cluster randomized trials

As shown in Fig. 3, our overall risk of bias judgement for the cluster randomized trials indicated some concerns for 3 studies [25, 27, 31] and high risk of bias for 2 studies [28, 30]. In all these trials, the randomization process was not elaborated.

Risk of bias for non-randomized studies

In the non-randomized studies, half of the studies were judged to have moderate risk [24, 29], and critical risk was found in the others [23, 26] as shown in Fig. 4. Critical risk in the selection of participants was in all studies. Bias due to confounding was judged critical in one study [26] and moderate in 3 [23, 24, 29].

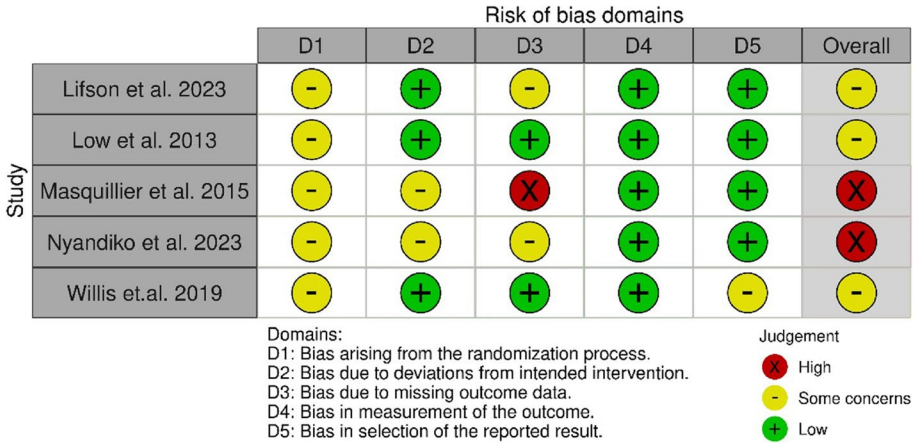

Fig. 3 Risk of bias visualization for cluster randomized trials

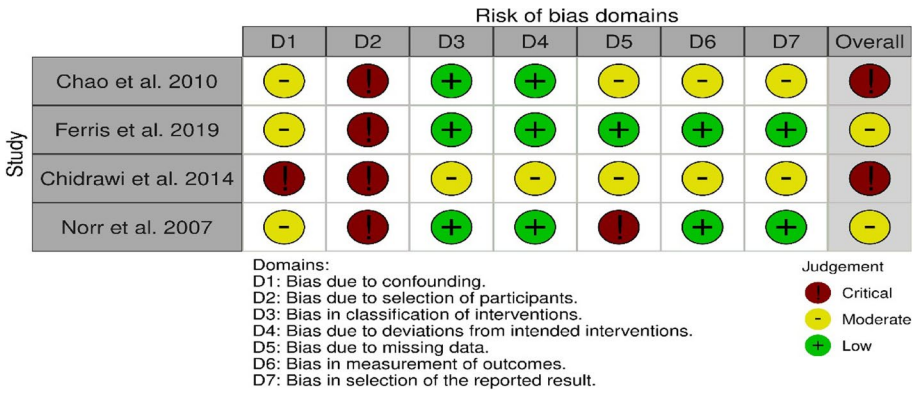

Fig. 4 Risk of bias visualization for non-randomized studies

Discussion

In this review, we aimed to synthesize evidence on the effectiveness and characteristics of community-based interventions against HIV-related stigma. Our understanding of such interventions was informed by the work of McLeroy et al. [19] who define them as "programs and initiatives that aim to improve the health and well-being of specific population groups within a defined local community." Such interventions bank on the community as a setting for delivery, target, source of agents, and a source of resources [34]. We found substantial evidence that these interventions can help reduce HIV-related stigma. However, due to considerable methodological and clinical heterogeneity among the included studies, we could not calculate pooled effect estimates, so the effectiveness of the interventions remains inconclusive. Additionally, the studies exhibited substantial risk of bias, which should be considered when interpreting these findings.

All interventions met the criteria of being community based, but they did not elaborate on the source of resources and the strategies that were implemented. We found that intervention strategies and resources were exogenous to implementation sites, with implications to scaling up and sustainability. We also found that most interventions targeted people living with HIV (stigmatized), taking the form of peer/mentor home-based programs. Notwithstanding their impact on internalized stigma [35], such interventions do not render much value to other forms, the basis on which stigma becomes anticipated and internalized [36]. There is thus a need to shift from individualized attention and focus more on the social and environmental influences of HIV-related stigma. Although individualized strategies have worked for chronic disease management [37], they appeal more to the restorative medical model [38] than the preventive health promotion model [39] and thus less likely to cause social change.

Community-based interventions against HIV-related stigma ought to be comprehensively designed to employ various strategies and to engage multiple categories of people to achieve population-level change. They also need to surpass agency for stigmatized individuals to also deconstruct entrenched historical and socio-cultural views in society that propagate stigma. This can take the form of durable educational programs in significant social settings such as schools where the majority of individuals can be reached during their formative years. The HIV-competent community framework [40] can guide the establishment of such interventions. Campbel et al. [40] define HIV-competent communities as settings where local people are more likely to collaborate on matters of HIV prevention and support for those living with HIV. The framework is consistent with the social-ecological systems theory in health promotion [41], the concept of social capital [42], and the postulates by Gofman [7] regarding the influence of the whole of society in the stigma process. Three strategies of the HIV competence framework: creating knowledge and skills, building safe spaces, and promoting a sense of ownership should thread through community interventions.

All interventions we reviewed involved the provision of information as a way of advancing knowledge for the target audience. However, there was no indication of community participation in the formulation of intervention strategies. It has been found that interventions in which community members are not fully engaged at all stages are costly and unsustainable [43]. The "bottom-up" approach in community participation leads to a sense of ownership and this creates positive behavior change [44]. We contend that developing such comprehensive interventions with high community engagement at all levels, from conceptualization to implementation and evaluation, takes time, but it is a worthwhile venture for durable outcomes.

Based on our cost and sustainability evaluation, most studies were found to be of low cost and sustainable, a vital feature of community-based behavioral interventions [45]. Minimizing costs is necessary regardless of the socio-economic context if community members are to continue with the intervention beyond the life of efficacy and effectiveness research projects [46]. However, working with community members in a participatory way to build a sense of ownership was not explicit in the studies reviewed. This threatens the continuity of even the low monetary cost interventions since community members incur opportunity costs.

Finally, the individualized approach we found in most of the studies involving people living with HIV as intervention recipients does not build safe social spaces. A safe social space [40] offers an opportunity for community members to break the silence around HIV and debunk entrenched stigmatizing attitudes, myths, and misconceptions. Building safe spaces requires interventions that involve all community members irrespective of their HIV status.

Quality of evidence, strengths, and limitations of the review

We restricted our search to studies published in English, and we did not include grey literature. It is possible that some effective community-based interventions that are not published and those reported in other languages could have been missed. However, the extensive search strategy we created, and the involvement of a variety of databases ensured that all studies that merited were included. The high methodological heterogeneity based on study designs, effect measures, analytical procedures, and reporting of findings did not allow for a meta-analysis to statistically synthesize findings to arrive at a pooled measure of effect. Additionally, our overall assessment found a high risk of bias in reviewed studies, largely due to non-randomization of participants during interventions. The findings should thus be interpreted with caution.

Conclusion

Community-based interventions appear to be effective in reducing HIV-related stigma. However, more robust randomized trials are needed to provide stronger evidence for this effect. Although these interventions have been multifariously developed in Sub-Saharan Africa, comprehensive strategies involving the stigmatized and the "stigmatizers" in a social change approach are lacking. The application of strategies without the involvement of community members in their design takes away a sense of community responsibility and this threatens the sustainability of such interventions.

Abbreviations

AIDS	Acquired immune deficiency syndrome
HIV	Human immunodeficiency virus
PLH	People living with HIV
PRISMA	Preferred Reporting Items of Systematic reviews and Meta-analysis
CFIR	Consolidated Framework of Implementation Research
RoB	Risk of bias
PLC	People living close

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13643-024-02751-6.

Supplementary Material 1.

Acknowledgements

This work was supported by the Research and innovation fund of Mountains of the Moon University in the Faculty of Health Sciences.

Authors' contributions
EK conceptualized the study, drafted the review protocol, conducted the database search, analyzed the data, and drafted the manuscript; LA conceptualized the study, drafted the review protocol, analyzed the data, and critically reviewed the manuscript; IP conceptualized the study, extracted data and critically reviewed the manuscript; AM conceptualized the study, extracted data, and critically reviewed the manuscript; EM conceptualized the study, assessed risk of bias, and critically reviewed the manuscript.

Funding
This work was supported by the Research and innovation fund of Mountains of the Moon University in the Faculty of Health Sciences. The funders had no role in conducting the review.

Data availability
Not applicable.

Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

Author details
[1]Department of Public Health, Faculty of Health Sciences, Mountains of the Moon University, Fort Portal, Uganda. [2]Department of Nursing and Midwifery, Faculty of Health Sciences, Mountains of the Moon University, Fort Portal, Uganda.

Received: 28 September 2023 Accepted: 22 December 2024
Published online: 10 January 2025

References

1. UNAIDS. Understanding fast-track, accelerating action to end AIDS epidemic by 2030. 2015. Accessed on 23 Dec 2021 Via https://www.unaids.org/sites/default/files/media_asset/201506_JC2743_Understanding_FastTrack_en.pdf
2. French H, Greeff M, Watson MJ, Doak CM. HIV stigma and disclosure experiences of people living with HIV in an urban and a rural setting. AIDS Care. 2015;27(8):1042–6.
3. Nurfalah F, Yona S, Waluyo A. The relationship between HIV stigma and adherence to antiretroviral (ARV) drug therapy among women with HIV in Lampung, Indonesia. Enfermeria Clin. 2019;29:234–7.
4. Kingori C, Reece M, Obeng S, Murray M, Shacham E, Dodge B, … & Ojakaa D. Impact of internalized stigma on HIV prevention behaviors among HIV-infected individuals seeking HIV care in Kenya. AIDS Patient Care STDs. 2012;26(12):761–768.
5. Britto C, Mehta K, Thomas R, Shet A. Prevalence and correlates of HIV disclosure among children and adolescents in low-and middle-income countries: a systematic review. J Dev Behavioral Pediatr: JDBP. 2016;37(6):496.
6. Katz IT, Ryu AE, Onuegbu AG, Psaros C, Weiser SD, Bangsberg DR, Tsai AC. Impact of HIV- related stigma on treatment adherence: systematic review and meta-synthesis. J Int AIDS Soc. 2013;16:18640.
7. Goffman E. Stigma and social identity. 1963. Accessed via https://cdn.penguin.co.uk/dam-assets/books/9780241548011/9780241548011-sample.pdf. 28th September 2023.
8. Earnshaw VA, Smith LR, Chaudoir SR, Amico KR, Copenhaver MM. HIV stigma mechanisms and well-being among PLWH: a test of the HIV stigma framework. AIDS Behav. 2013;17:1785–95.
9. Stutterheim SE, Bos AE, Pryor JB, Brands R, Liebregts M, Schaalma HP. Psychological and social correlates of HIV status disclosure: the significance of stigma visibility. AIDS Educ Prev. 2011;23(4):382–92.
10. Quinn DM, Earnshaw VA. Concealable stigmatized identities and psychological well-being. Soc Person Psychol Compass. 2013;7(1):40–51. https://doi.org/10.1111/2Fspc3.12005.
11. Deacon H. Towards a sustainable theory of health-related stigma: lessons from the HIV/AIDS literature. J Commun Appl Soc Psychol. 2006;16(6):418–25.
12. Earnshaw VA, Chaudoir SR. From conceptualizing to measuring HIV stigma: a review of HIV stigma mechanism measures. AIDS Behav. 2009;13:1160–77.
13. Herek GM, Capitanio JP. Symbolic prejudice or fear of infection? A functional analysis of AIDS-related stigma among heterosexual adults. Basic Appl Soc Psychol. 1998;20(3):230–41.
14. Steward WT, Herek GM, Ramakrishna J, Bharat S, Chandy S, Wrubel J, Ekstrand ML. HIV-related stigma: adapting a theoretical framework for use in India. Soc Sci Med. 2008;67(8):1225–35.
15. Campbell C, Foulis CA, Maimane S, Sibiya Z. "I have an evil child at my house": stigma and HIV/AIDS management in a South African community. Am J Public Health. 2005;95(5):808–15.
16. Nyblade L, Hong KT, Anh NV, Ogden J, Jain A, Stangl A, … Ashburn K. Communities confront HIV stigma in Viet Nam: participatory interventions reduce HIV stigma in two provinces. Washington, DC: International Center for Research on Women. 2008.
17. Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). Cochrane Handbook for Systematic Reviews of Interventions version 6.4 (updated August 2023). Cochrane, 2023. Available from: www.training.cochrane.org/handbook.
18. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD,… Moher D. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. Int J Surg 2021;88:105906.
19. McLeroy KR, Norton BL, Kegler MC, Burdine JN, Sumaya CV. Community-based interventions. Am J Public Health. 2003;93(4):529–33.
20. Kimera E, Vindevogel S, Reynaert D, Justice KM, Rubaihayo J, De Maeyer J, … Bilsen J. Experiences and effects of HIV-related stigma among youth living with HIV/AIDS in Western Uganda: A photovoice study. PloS One, 2020;15(4):e0232359.
21. Kimera E, Vindevogel S, Engelen AM, De Maeyer J, Reynaert D, Kintu MJ, … & Bilsen J. HIV-related stigma among youth living with HIV in Western Uganda. Qual Health Res 2021;31(10):1937–1950.
22. Kimera E, Vindevogel S. Photovoicing empowerment and social change for youth living with HIV/AIDS in Uganda. Qual Health Res. 2022;32(12):1907–14.
23. Chao LW, Gow J, Akintola G, Pauly M. HIV/AIDS stigma attitudes among educators in KwaZulu-Natal, South Africa. J Sch Health. 2010;80(11):561–9.
24. Ferris France N, Macdonald SHF, Conroy RR, Chiroro P, Ni Cheallaigh D, Nyamucheta M, … & Byrne E. 'We are the change'-an innovative community-based response to address self-stigma: a pilot study focusing on people living with HIV in Zimbabwe. PloS one 2019;14(2):e0210152.
25. Lifson AR, Hailemichael A, Workneh S, MacLehose RF, Horvath KJ, Hilk R, … & Shenie T. Impact of community support workers in rural Ethiopia on emotional and psychosocial health of persons living with HIV: results of a three-year randomized community trial. AIDS Behavior 2023;1–10.
26. Chidrawi HC, Greeff M, Temane QM. Health behaviour change of people living with HIV after a comprehensive community-based HIV stigma reduction intervention in North-West Province in South Africa. SAHARA: J Soc Aspects HIV/AIDS Res Alliance 2014;11(1):222–232.
27. Low C, Pop-Eleches C, Rono W, Plous E, Kirk A, Ndege S, ... & Thirumurthy H. The effects of home-based HIV counseling and testing on HIV/AIDS stigma among individuals and community leaders in western Kenya: evidence from a cluster-randomized trial. AIDS Care 2013;25(sup1):S97-S107.
28. Masquillier C, Wouters E, Mortelmans D, le Roux Booysen F. The impact of community support initiatives on the stigma experienced by people living with HIV/AIDS in South Africa. AIDS Behav. 2015;19:214–26.
29. Norr KF, Norr JL, Kaponda CP, Kachingwe SI, Mbweza EM. Short term effects of a peer group intervention for HIV prevention among trainee teachers in Malawi. Afr J AIDS Res. 2007;6(3):239–49.
30. Nyandiko W, Chory A, Baum A, Aluoch J, Ashimosi C, Scanlon M, … & Vreeman R. Multi-media teacher training and HIV-related stigma among primary and secondary school teachers in Western Kenya. AIDS Care 2023;35(5):643–650.

31. Willis N, Milanzi A, Mawodzeke M, Dziwa C, Armstrong A, Yekeye I, … & James V. Effectiveness of community adolescent treatment supporters (CATS) interventions in improving linkage and retention in care, adherence to ART and psychosocial well-being: a randomised trial among adolescents living with HIV in rural Zimbabwe. BMC Publ Health 2019;19(1):1–9.
32. Damschroder L. The consolidated framework for implementation research (CFIR). In Implementation Science. Routledge. 2022; 38–41.
33. Higgins JP, Altman DG, Gøtzsche PC, Jüni P, Moher D, Oxman AD, … & Sterne JA. The Cochrane Collaboration's tool for assessing risk of bias in randomized trials. BMJ 2011;343.
34. Merzel C, D'Afflitti J. Reconsidering community-based health promotion: promise, performance, and potential. Am J Public Health. 2003;93(4):557–74.
35. Lee RS, Kochman A, Sikkema KJ. Internalized stigma among people living with HIV-AIDS. AIDS Behav. 2002;6:309–19.
36. Peltzer K, Pengpid S. Prevalence and associated factors of enacted, internalized and anticipated stigma among people living with HIV in South Africa: results of the first national survey. HIV/AIDS-Res Palliat Care 2019;275–285.
37. Embuldeniya G, Veinot P, Bell E, Bell M, Nyhof-Young J, Sale JE, Britten N. The experience and impact of chronic disease peer support interventions: a qualitative synthesis. Patient Educ Couns. 2013;92(1):3–12.
38. Engel GL. The need for a new medical model: a challenge for biomedicine. Psychodynamic psychiatry. 2012;40(3):377–96.
39. Srof BJ, Velsor-Friedrich B. Health promotion in adolescents: a review of Pender's health promotion model. Nurs Sci Q. 2006;19(4):366–73.
40. Campbell C, Nair Y, Maimane S. Building contexts that support effective community responses to HIV/AIDS: a South African case study. Am J Community Psychol. 2007;39:347–63.
41. Bunch MJ. Ecosystem approaches to health and well-being: navigating complexity, promoting health in social–ecological systems. Syst Res Behav Sci. 2016;33(5):614–32.
42. Hawe P, Shiell A. Social capital and health promotion: a review. Soc Sci Med. 2000;51(6):871–85.
43. Golden SD, Earp JAL. Social ecological approaches to individuals and their contexts: twenty years of health education & behavior health promotion interventions. Health Educ Behav. 2012;39(3):364–72.
44. Matindo AY, Kalolo A, Kengia JT, Kapologwe NA, Munisi DZ. The role of community participation in planning and executing malaria interventions: experience from implementation of biolarviciding for malaria vector control in Southern Tanzania. BioMed Res Int 2022;2022.
45. Bogart LM, Uyeda K. Community-based participatory research: partnering with communities for effective and sustainable behavioral health interventions. 2009.
46. Brown PM, Cameron LD, Ramondt S. Sustainability of behavioral interventions: beyond cost-effectiveness analysis. Int J Behav Med. 2015;22:425–33.

Publisher's Note