



Published in final edited form as:

AIDS Behav. 2016 October ; 20(10): 2452–2463. doi:10.1007/s10461-016-1307-z.

Improving engagement in the HIV care cascade: A systematic review of interventions involving people living with HIV/AIDS as peers

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Abstract

Improving patient engagement in HIV care is critical for maximizing the impact of antiretroviral therapy (ART). We conducted a systematic review of studies that used HIV-positive peers to bolster linkage, retention, and/or adherence to ART. We searched articles published and indexed in Pubmed, PsycINFO, and CINAHL between 1996–2014. Peers were required to be HIV-positive. Studies were restricted to those published in English. Nine studies with n=4,658 participants met the inclusion criteria. Peer-based interventions were predominantly focused on improving adherence to ART, or evaluations of retention and adherence via viral suppression. Five (56%) were conducted in sub-Saharan Africa. Overall findings were mixed on the impact of peers on ART adherence, viral suppression, and mortality. While positive effects of peer interventions on improving linkage and retention were found, there were limited studies assessing these outcomes. Additional research is warranted to demonstrate the impact of peers on linkage and retention in diverse populations.

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This work was previously presented as a poster at the 10th International HIV Treatment and Prevention Adherence Conference in Miami, Florida, in June, 2015.

Keywords

HIV/AIDS; peers; interventions; linkage; retention; adherence; ART; systematic review; sub-Saharan Africa

INTRODUCTION

The HIV care cascade refers to the ongoing engagement in HIV care needed for people diagnosed with HIV to achieve viral suppression. Typically the care cascade includes diagnosis, initial linkage to care, initiation and adherence to antiretroviral therapy (ART), and retention in care over time (1). Improving patient engagement in the HIV care cascade is critical for maximizing the impact of ART worldwide. Despite substantial increases in the number of individuals receiving ART in the past decade, the provision of long-term HIV treatment and care, particularly in low- and middle-income countries, remains challenging. Several recent systematic reviews have highlighted that additional efforts are needed to improve linkage to and retention in HIV care (2,3), as well as in supporting ART adherence (4), among people living with HIV (PLHA).

The efficacy of interventions designed to improve linkage and retention in HIV care and adherence to ART has also been recently reviewed (5–7). Interventions involving peers in various capacities were highlighted as one potential approach to improve the engagement of PLHA in care (5). Peer interventions are a common strategy to promote and sustain various HIV-related behaviors (8) and employ the use of individuals who are similar to patients with respect to important demographic or social characteristics (9). Peers play many roles in HIV prevention and treatment interventions, including educating patients, offering social support, and providing referrals for social services. Peers have also been employed as navigators, working directly with patients to identify and overcome specific barriers to accessing care and maintaining engagement in HIV care (7). In these roles peers offer patients a combination of logistical assistance with navigating the health care delivery system (e.g., scheduling appointments, arranging transportation, etc.), as well as social and emotional support.

Despite a number of studies implemented to improve HIV outcomes through the use of peers, there has been a lack of conceptual clarity regarding the definition of peers (9). Often, peers are defined as those who share risk behaviors or as individuals living in the same geographic region. However, the mechanisms through which peers may have an impact on behaviors may differ according to their shared characteristics. Our goal was to understand the impact of interventions that incorporated peers, defined explicitly as those who identified as PLHA, on linkage and retention of HIV-positive patients to HIV care and adherence to ART. By defining peers as PLHA, the most salient social connection between HIV-positive peers was the driving mechanism through which peer interventions in the included studies were designed to have an impact on behavioral change or maintenance of behaviors related to the care cascade. When peers share an HIV diagnosis, they may relate to HIV patients with respect to shared experience living with HIV and accessing HIV care. As a result, they

may be able to offer support for experiences the patient undergoes following diagnosis, such as acceptance of HIV status and disclosure to family and friends.

Given the lack of an existing synthesis of research on the effectiveness of peer interventions to improve patient engagement in the HIV care cascade, and the lack of conceptual clarity regarding peers as PLHA in this context, we conducted a systematic review of studies that employed the use of HIV-positive peers to bolster patient linkage and/or retention in HIV care and/or adherence to ART.

METHODS

This systematic review was conducted in accordance with the 2009 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) tool (10). It also followed Cochrane Collaboration procedures, which specify guidelines for defining the systematic review question, searching for studies, selecting studies, extracting data, appraising the risk of bias in included trials, and analyzing data (11).

Inclusion criteria

This systematic review included any study that reported findings from an evaluation of peer-based interventions for PLHA designed to improve engagement in the HIV care cascade. A peer was defined explicitly as HIV-positive. Studies were not restricted to any geographic region and could involve PLHA from anywhere in the world. Our patient outcomes of interest included: linkage to care following HIV diagnosis, retention in HIV care over time, and/or adherence to ART. Definitions of linkage to care, retention in care and adherence to ART were based on the outcomes reported in the studies. Measurement of linkage and retention to care outcomes were variable and could include self-report, data abstracted from medical records, or viral suppression. Measurement of adherence to ART could include self-report, pill counts, electronic monitoring systems, or viral suppression.

Study designs included any randomized controlled trials (RCTs), quasi-randomized controlled trials, and nonrandomized controlled studies of peer-based interventions compared to any control group, in which control group outcomes were measured concurrently with intervention group outcomes. We did not *a priori* exclude studies of evaluations of peer-based interventions that were integrated into current HIV treatment programs, as long as there were comparable control groups with concurrently measured outcomes. No exclusions were made by control group condition (e.g., standard of care, no treatment, attention-matched treatment, etc.) or by demographic characteristics or any other characteristics of the peers. There were no exclusions by intervention setting, timing, dosage, program activities, or organization implementing or evaluating the intervention.

Literature search

Reviewers conducted electronic searches in January and February 2015 of articles indexed in Pubmed, PsycINFO, and CINAHL between 1996–2014. We restricted the literature to studies published from 1996 onward, as this year marked the beginning of the era of HIV combination therapy. The search included terms specific to HIV/AIDS, peer-based interventions, and the relevant outcomes. Keywords used included: *[(HIV) OR (AIDS) OR*

(human immunodeficiency syndrome) OR (testing) OR (counseling)] AND [(RCT) OR (cluster randomized trial) OR (prospective) OR (cohort)] AND [(linkage) OR (engagement) OR (adherence) OR (treatment) OR (retention)] AND [(peer) OR (opinion leader) OR (lay worker) OR (patient navigator) OR (community health worker) or (patient advocate) OR (care navigator) OR (peer counselor) OR (outreach worker)]. Details about search strategy are provided in Appendix 1 and are available by request to the corresponding author. Additional studies were identified through examination of the reference lists of key papers. All publications were exported to an Endnote file (Endnote X7, Thomson Reuters, San Francisco, CA), merged, and the duplicates deleted.

Prior to conducting the initial review, two reviewers independently screened a subset of abstracts and achieved agreement on inclusion criteria. The two reviewers then independently screened all of the abstracts of the articles identified in the initial search for determining their inclusion criteria. They applied a liberal approach to the initial screen, including any potentially relevant articles for additional review. Two additional reviewers then independently screened any article that was potentially relevant and adjudicated inclusion criteria. After the initial round of screening of abstracts, all four reviewers examined the full text of published studies for inclusion in the final sample. Reviewers were not blind to the authors, funding, or any other characteristics of the studies reviewed. Study authors were contacted as needed for additional information. This was particularly relevant for determining the HIV-status of the peers. Statistical pooling of estimates was not possible owing to the heterogeneity of outcomes measured.

Data extraction

Reviewers extracted data including details about the study design, participants, setting, intervention (including information about peers involved in the intervention), control groups, data collection methods, measurement of outcomes, and main findings. If the search included multiple reports from the same intervention, data were initially included from each article. Extracted data was then compiled and examined along a number of different axes including: study outcome (linkage, retention, and/or adherence), study setting (geographic region), study design (randomized controlled trial vs. other), and main findings (positive, negative or equivalent effects of intervention).

Assessment of Methodological Quality of included studies

Methodological quality of the intervention evaluations was assessed using the Quality Assessment Tool for quantitative studies developed by the Effective Public Health Practice Project (12). Studies were assessed for selection bias, study design, confounders, blinding, data collection and withdrawals/drop-outs. Based on the ratings of each of the eight components, each study received an overall global rating of strong, moderate or weak. In order for a study to receive a strong rating, four of the six quality assessment criteria had to be rated as strong, with no weak ratings. A moderate rating was achieved if less than four criteria were rated strong and one criterion was rated weak. A weak rating was given if 2 or more criteria were rated weak. Following the quality assessment stage, the inclusion of studies and extraction of key findings was finalized. Extracted data were entered into a table of study characteristics including the quality assessment ratings for each study.

RESULTS

The flow chart in Figure 1 describes the articles examined and excluded in our search. In total 8,567 studies were identified through the three databases, with 27 additional articles identified from reference lists of key papers. After removing duplicate records and reviewing abstracts for relevance, 54 studies were included in the full text review. It was necessary to contact the authors of 10 papers from the full text review to determine the HIV-status of peers in the intervention. Following the full text review and correspondence with authors as needed, nine studies met the inclusion criteria.

Table 1 provides a summary of the nine studies included in the review. Studies that met the inclusion criteria were primarily focused on improving adherence to ART (k=8), with several that examined viral suppression as a measure of retention and adherence (k=7), and only one on linkage to care. Five of the nine included studies (Chang et al. (13), Hatcher et al. (14), Kiweewa et al. (15), Richter et al. (16), Selke et al. (17)) were conducted in sub-Saharan Africa, with the remainder conducted in North America (Enriquez et al. (18), Purcell et al. (19), Simoni et al. 2009 (20), Simoni et al. 2007 (21)).

The nine included studies enrolled n=4,658 participants at baseline. Study populations varied by sex and stage of HIV care cascade at baseline. Five studies (Chang et al. (13), Selke et al. (17), Enriquez et al. (18), Simoni et al. 2009 (20), Simoni et al. 2007 (21)) recruited both male and female adult patients (n=1,924) from clinical HIV care venues, who were either ART naïve or initiating ART at baseline, with either demonstrated difficulty with adherence or no discernible adherence problems. Two studies, by Richter et al. (16) and Kiweewa et al. (15), were restricted to adult women (n=1,285) recruited from prevention-of-mother-to-child-transmission (PMTCT) programs. One study, by Purcell et al. (19), recruited n=966 injection drug users from community-based venues, with self-identification as HIV-positive as the only recruitment criteria related to the HIV care cascade. One study focused on linkage to care by Hatcher et al. (14) recruited n=483 adults newly diagnosed with HIV through community-based counseling and testing.

Of the nine included studies, eight (Chang et al. (13), Selke et al. (17), Enriquez et al. (18), Simoni et al. 2009 (20), Simoni et al. 2007 (21), Richter et al. (16), Kiweewa et al. (15), Purcell et al. (19)) were identified as randomized controlled trials, with two of these (Chang et al. (13), Richter et al.(16)) involving cluster randomization at the clinic level. The remaining study by Hatcher et al. (14) was a cross-sectional follow-up of a cohort of adults newly diagnosed with HIV. This review included two interventions delivered using group sessions (16,19), individual sessions (18) or a combination of group and individual sessions delivered by a peer (13,20,21). Sessions focused predominantly on social support and educational information about HIV and ART. Four studies (Chang et al. (13), Selke et al. (17), Kiweewa et al. (15), Hatcher et al. (14)) also included home visits by peers. Two studies (Enriquez et al.(18), Purcell et al.(19)) were developed according to a specific theoretical basis, and included content based on the trans-theoretical model of behavior change (18), or a combination of social learning theory, social identity theory, and the Information, Motivation and Behavioral Skills (IMB) Model (19). Control conditions included standard of care (13,15–17,20,21) or time/attention matched controls (18,19).

Table 2 provides details on the results of the nine included studies. Seven of the nine studies (Chang et al. (13), Enriquez et al. (18), Kiweewa et al. (15), Purcell et al. (19), Selke et al. (17), Simoni et al. 2009 (20), Simoni et al. 2007 (21)) measured changes in viral load, viral suppression, or viral failure, a surrogate marker that reflects both retention in care and adherence to medications. Of these, four studies found no differences in viral load outcomes comparing the peer intervention group with control groups (15,17,19–21), while one showed positive intervention effects of improved adherence along with decreased viral load (18), and another study showed positive effects on viral suppression, but only after 96 weeks post-ART initiation (13). Selke et al. (17) used a non-inferiority trial design and demonstrated equivalent effects on viral outcomes between peer-based intervention and standard of care (monthly clinic visits).

Among the seven studies that measured adherence, there were mixed results, with two studies (Enriquez et al.(18), Richter et al. (16)) showing a positive impact of peers on adherence, one (Purcell et al. (15)) showing no effect of peers on adherence, and three (Chang et al. (13), Simoni et al. (21), and Simoni et al. (20)) showing mixed results. Kiweewa et al.(15) used a non-inferiority trial design and demonstrated equivalent effects on adherence between peer-based intervention and standard of care (clinician-delivered care). Among the interventions with positive effects on adherence, the study by Richter et al. (16) was among pregnant women using PMTCT in South Africa, incorporating the use of peer mentors through a cluster randomized controlled trial design. Clinics were randomized to standard of care or the intervention, consisting of sessions with a peer mentor, and improved adherence was demonstrated during the post-natal period among mothers. Another study demonstrating positive intervention effects on adherence was by Enriquez et al. (18). It was conducted among a small sample (n=20) of patients who had documented non-adherence and were randomized to either an attention-matched control or a peer-led intervention focused on behavior change to improve adherence to ART.

Only two studies examined retention explicitly. Chang et al. (13) demonstrated reduced losses-to-follow-up in the intervention arm compared with the control arm, while Richter et al. (16) showed increased attendance at clinical visits post-partum for mothers accessing PMTCT services. Hatcher et al. (14) showed improved linkage to care following a visit from a peer navigator after HIV testing.

Methodological ratings for the nine studies are shown in Table 3. Eight of the 9 studies (13, 15, 16, 17, 18, 19, 20, 21) were rated as having a strong overall quality, with strong scores given for selection bias, study design, control of confounders, data collection methods, and reporting of withdrawals and dropouts. One study (14) received a moderate rating overall, with a weak rating for selection bias, moderate ratings for study design and data collection methods, and strong ratings for confounders and reporting of withdrawals and dropouts. This study was not a randomized design, had moderate levels of acceptance of the intervention among those participating, and relied on self-reported measures of linkage to care (14). No study received a weak overall rating.

DISCUSSION

The results presented in this systematic review suggest that despite strong quality ratings of the included studies, consistent evidence does not yet exist on the use of HIV-positive peer interventions to improve engagement in HIV care and adherence to ART among PLHA. Evidence of the impact of peers on patients' viral suppression and medication adherence was mixed. Two non-inferiority studies showed that peer interventions performed similarly to standard care on clinical outcomes (15,17). However, studies with viral suppression as the outcome showed a greater number of null findings. Although reasons for the null effects on viral suppression outcomes differed according to each included study, previous research has noted the challenges in testing HIV prevention trials on biomedical outcomes due to inadequate power, choice of control group, and other methodological considerations (22). Positive effects of peers were seen for adherence to medications in two studies, though there were limitations in terms of the generalizability of the findings from these trials, with one conducted among pregnant women in South Africa (16) and the other among a small sample (n=20) of non-adherent patients in the USA (18).

The findings of this study indicated that peer-based interventions might be a promising approach for linking patients to care and retaining patients in HIV. Because we restricted this review to studies examining the role of HIV-positive peers on improving outcomes along the HIV care cascade, the role of social connection and support from another person living with HIV may be more salient for engaging with clinical care, compared with the daily task of taking medications. However, only two studies measured retention explicitly using rates of lost-to-follow-up or adherence to clinic visits (13,16), and only one study of linkage to care was identified in this literature search (14). The preliminary evidence from these studies, however, suggested that peers had a demonstrable impact on linkage to and retention in HIV care, although one study was not a randomized controlled trial and had limitations in terms of potential biases (14). Additional research is urgently needed to expand our understanding of the impact of peers on retention in HIV care and on linkage to care in a variety of diverse settings. In addition, studies outside of North America and sub-Saharan Africa would add to the evidence base for the generalizability of intervention approaches incorporating the use of HIV-positive peers.

This study attempted to clarify the definition of a peer by restricting inclusion to evaluations of interventions that involved peers who explicitly identified as HIV-positive. Qualitative research suggests two potential mechanisms whereby HIV-positive peers may have an impact on behaviors critical to engagement in HIV care. The first suggests that the emotional and social support provided by the peer may lead to reductions in symptoms of distress caused by an HIV diagnosis and/or to acceptance of the need for long-term healthcare. The connection formed around the shared experience of peers who are living with HIV may have beneficial impacts on health and well-being (23,24). Secondly there may be reductions in internalized stigma, whereby the PLHA witnesses firsthand, through interaction with a designated peer, how HIV is not necessarily a "death sentence," but can be a chronic, manageable condition when appropriately engaging with care and treatment (25,26). It is interesting to note that effective interactions among peers may depend on subgroup identities and the particular stage of HIV illness. For example, Yan et al. demonstrated improved

linkage to care in China among men who were newly diagnosed and offered peer support by other men who have sex with men (MSM) through a community-based agency, compared with those followed up by health professionals (27).

Positive effects identified in this review suggest that peer interventions may have particular utility in resource-constrained settings. Indeed, over half of the included studies were conducted in resource-limited settings in sub-Saharan Africa. Of these five studies, two were non-inferiority trials intended to demonstrate that models of care delivery incorporating the use of peers were equally effective as standard care delivery models that relied on the use of more highly trained professionals such as physicians (15,17). In settings with heavy burdens on the healthcare infrastructure, high patient loads, insufficient numbers of trained healthcare personnel, and significant migration of healthcare workers to more lucrative sectors and regions, peer-based interventions for improving engagement in the care cascade may be particularly cost-effective. However, we are not aware of any studies on cost-effectiveness of peer-based models.

A limitation of this review was the inability to isolate the impact of the peer intervention apart from other services and interventions that were being offered to patients either along with the peer intervention or to the clinic population as a whole. For example, one study from Uganda offered peer support in the form of home visits along with care delivered by nurses in comparison to standard of care. It is possible that the effect of peers was influenced in unknown ways by the additional care delivery by nurses, having an impact on the main outcome of interest (15). In addition, this review included a broad scope of primary research, including studies measuring different outcomes along the HIV care continuum, which affected our ability to combine results for a meta-analysis.

This review also highlighted a number of gaps in the existing literature on the evaluation of peer interventions. Detailed information about the peers involved in program delivery was minimal and inconsistent across studies. There were few studies that focused on most-at-risk-populations. We found only one study that used peers to assess linkage to care among MSM (27), but this study was excluded because the peers were not explicitly HIV-positive. Future work on peer-led interventions for linkage and retention among vulnerable populations using rigorous evaluations methods may provide more robust findings among most-at-risk-populations who are difficult to access. The results of this study also substantiate the need to standardize outcomes representing the stages or steps along the HIV care cascade, in order to facilitate comparisons between studies. Even among the seven articles that measured biological outcomes, results were reported as a mix of viral suppression/failure at differing cut-points for detectability and/or changes in log viral load. This also limited our ability to conduct meta-analyses on the results from each trial. Efforts to harmonize measures and operational cut-points for assessing indicators of all steps along the HIV care continuum are recommended, in order to facilitate evidence synthesis and policy decision-making.

CONCLUSIONS

This systematic review suggests that peer interventions involving PLHA might have an impact on linking and retaining patients in HIV care, with mixed effects on adherence and viral suppression outcomes, but the effectiveness varied by study design and outcome measure to the extent that no consistent effect could be ascertained. Peer-based approaches appear to be broadly implemented (9), despite having an evidence base that remains quite limited, and thus the call for additional research. Future work in carefully designed studies with sufficient power to detect modest effects could help demonstrate the effectiveness of peers and for which outcomes they can be maximally successful in linkage, retention, and adherence to ART.

Acknowledgments

This research was supported by the National Institute of Mental Health (K01MH099966), the National Institute of Allergy and Infectious Diseases (R21AI116309), and the National Institute of Child Health and Development (R24HD077976).

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Appendix 1

PubMed

Term	Query
Peers	(Peer navigator* OR patient navigator* OR Peer counselor* OR Peer health navigator* OR peer educator* or patient educator OR community health worker* or CHW* OR community outreach* OR peer advisor or outreach worker* or care navigator* or patient promot* OR Patient advocate* OR patient expert* OR lay health worker* OR patient liaison OR paraprofessional navigation* OR peer volunteer* or peer group* OR peer volunteer* OR community health aid* or patient advocate*or adherence support workers or ASW* or ASWs or health community workers or HCWs)
Linkage, adherence and retention	(Linkage to care or engagement in care OR engage* in care OR link*[tw] OR link* to care*[MH] OR health care utilization OR healthcare utilization OR uptake or access* OR Health service*[MH] OR ambulatory care OR outpatient care OR retention*[MH] OR attrition or loss to follow-up* or enrol* OR OR enter* OR entry to care [tw] OR access* early OR connect or adherence or treatment OR service* OR care conti* OR outreach care* or link* or programs or improve* or access* OR refer* OR treatment clinic* OR seek service* OR seek care or treatment* OR retention OR keep* OR Kept OR return* OR appointment* OR miss* OR re enter OR adherence*[tw] OR adhere* OR Rengage* OR follow-up* OR visit* OR miss* OR schedule appointment*)
Study Design	(Randomized controlled trial*[MH] OR RCT[tiab] OR random allocation[MeSH] OR quasi-experiment [MH] OR quasixperiment(mh) OR quasi-random OR quasirandom* OR non-random* OR nonrandom* OR compar*OR controlled clinical trial [tw] OR random allocate* OR double-blind method[MH] or single-blind method[MH] OR clinical trial [ti] OR (singl*OR doubl* OR tripl*) and (mask* OR blind*) OR (placebo* OR random\$ OR research design OR comparative stud\$ OR nonrandomized trial* OR community trial* OR evaluation stud\$ OR follow-up stud\$ OR prospective stud* OR control* OR prospective [MH] OR cohort studies [MH] OR longitudinal study*[MH] or cohort* OR clinical or trial* cross sectional [tw] OR crossectional*or qualitative[tw] or quantitative[tw])
HIV/AIDS	(HIV* OR AIDS* OR HIV Infections[MeSH] OR HIV[MeSH] OR hiv[tw] OR hiv-1*[tw] OR hiv-2*[tw] OR hiv1[tw] OR hiv2[tw] OR hiv infect*[tw] OR human immunodeficiency virus[tw] OR human immunodeficiency virus[tw] OR human immuno-deficiency virus[tw] OR human immunodeficiency virus[tw] OR ((human immun*) AND (deficiency virus[tw])) OR acquired immunodeficiency syndrome[tw] OR acquired immunodeficiency syndrome[tw] OR acquired immuno-deficiency syndrome[tw] OR ((acquired immun*) AND (deficiency syndrome[tw])) OR "Sexually Transmitted Diseases, Viral"[MeSH:NoExp])

CINAHL

Term	Query
Peers	Peer navigator* OR patient navigator* OR Peer counselor* OR Peer health navigator* OR peer educator* or patient educator OR community health worker* or CHW* OR community outreach* OR peer advisor or outreach worker* or care navigator* or patient promot* OR Patient advocate* OR patient expert* OR lay health worker* OR patient liaison OR paraprofessional navigation* OR peer volunteer* or peer group* OR peer volunteer* OR community health aid* or patient advocate*or adherence support workers or ASW* or ASWs or health community workers or HCWs
Linkage, adherence and retention	Linkage to care or engagement to care OR linkage* OR retention or attrition or connect or early or initiate or link* to care or engage in care OR "health care utilization*"OR healthcare utilization* OR uptake or access* OR Health service*OR ambulatory care OR outpatient care OR engage* OR enrol* OR link OR enter OR access* OR treatment OR adherence OR service* OR care conti* OR outreach care or link* or programs or improv* OR access OR refer* OR treatment clinic* OR seek service* OR seek care or treatment*OR keep* OR Kept OR return* OR appointment* OR miss* OR re enter OR appointment adherence* OR Re-engage* OR follow-up* OR loss to follow up or visit* OR miss* OR schedule appointment*
Study design	random allocation[MH] OR quasi-experiment [MH] OR quasixperiment\$(MH) OR quasi#random OR quasirandom* OR non-random* OR nonrandom* OR compar*OR "randomized controlled trial*" or controlled clinical trial [MH]OR rct* OR random allocate* OR double#blind method#[MH] or single-blind method[MH] OR clinical trial# [MH] OR (singl*OR doubl* OR tripl*) and (mask* OR blind*) OR (placebo* OR random\$ OR research design OR comparative stud\$ OR non#randomized trial* OR community trial* OR evaluation stud\$ OR follow-up stud\$ OR prospective stud* OR control* OR prospective [MH] OR cohort studies [MH] or longitudinal study#[MH] or cohort* OR clinical or trial* cross sectional* quantitative or qualitative

Term	Query
HIV/AIDS	HIV\$ or AIDSS\$ or HIV Infect* or hiv* or hiv-1\$ or hiv-2\$ or hiv1\$ or hiv2\$ or hiv infect* or human immunodeficiency virus\$ or human immune?deficiency virus\$ or human immuno-deficiency virus\$ or human immune-deficiency virus\$ or (human immun\$ and deficiency virus\$) or acquired immunodeficiency syndrome\$ or acquired immunodeficiency syndrome\$ or acquired immuno-deficiency syndrome\$ or acquired immune-deficiency syndrome\$ or (acquired immun\$ and deficiency syndrome\$) or Sexually Transmitted Disease\$ or sexually transmitted infect\$ or sti*

PsycINFO

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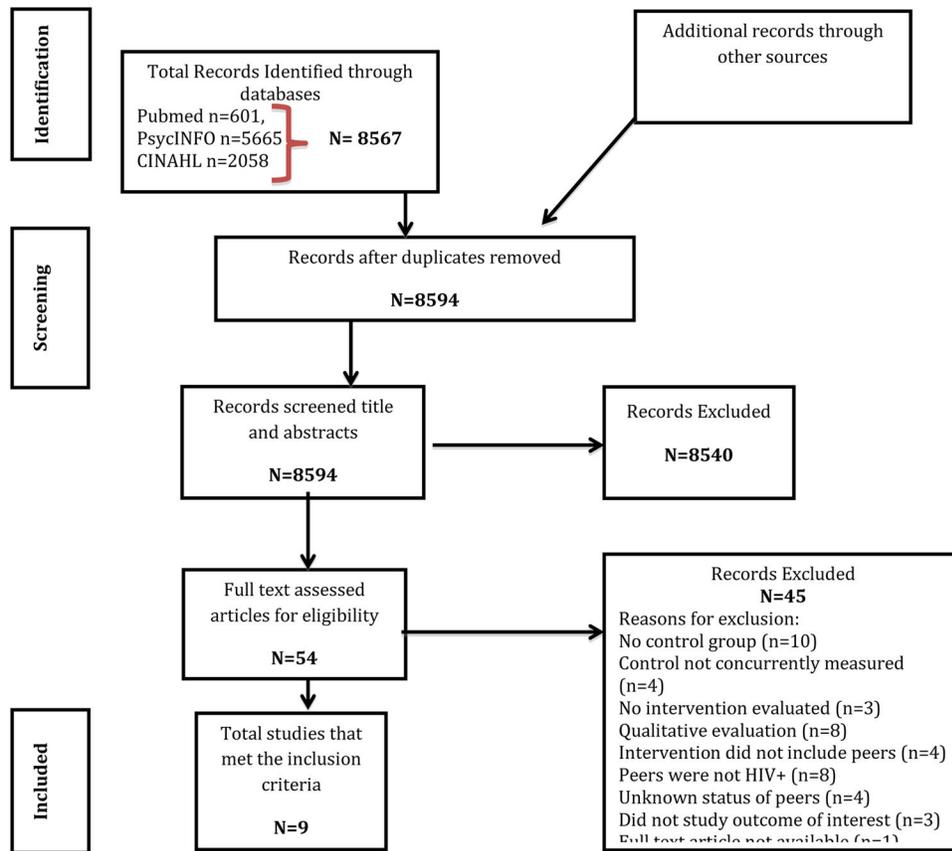


Figure 1. Peer-based interventions for engagement in HIV care continuum: Flow chart of article inclusion and exclusion

Table 1

Details of nine studies that met the inclusion criteria for the systematic review.

Author Year & Ref. no.)	Location	Sample size	Study design	Intervention	Peers	Comparison group	Outcome/s	Main Findings
Chang 2010 (13)	Rakai District, southwest Uganda	N=1336 adult patients followed from May 2006 through July 2008	Cluster randomized trial: clinics were randomized 2:1 to receive intervention (n=10) or standard of care (n=5)	Peer health workers provided ART counseling and support in group and individual sessions at the clinic. They conducted home visits biweekly and reviewed symptoms, self-reported adherence to ART, and conducted pill counis. Also offered counseling and education on ART adherence and general knowledge regarding HIV/AIDS. Facilitated transfer for patients in need of urgent care.	Patients living with HIV/AIDS, who were currently taking ART, had good adherence for at least 6 months, literate, nominated by fellow patients and trained in program delivery.	Standard of care, including peer education	Adherence (pill count), virologic failure (>400 copies/mL cumulatively and at 24-week intervals), mortality, lost- to-follow-up, CD4	Intention to treat analysis showed no differences in ART adherence, cumulative risk of virologic failure, or short-term virologic outcomes. Virologic failure rates >96 weeks post-ART were decreased in the intervention compared to control arm. Decreased lost-to-follow-up in intervention arm.
Enriquez 2014 (18)	Midwestern, Kansas city, Missouri, USA	N=20 community-dwelling adults with medical record evidence of non-adherence and VL>200 copies/mL	Controlled pilot feasibility study: participants randomized to intervention or time/contact-matched comparison intervention	Peer-led intervention delivered at the individual level based on the readiness stage for initiating and maintaining healthful behavior changes.	Lay individuals living with HIV and experienced working in the HIV medical care setting. They were diverse with regard to gender, ethnicity and language.	Time/contact matched control: education about the benefits of healthy eating and exercise	Adherence (MEMS, pharmacy refills), viral suppression (<200 copies/mL).	Significantly improved adherence in the intervention arm.

Author Year & Ref. no.)	Location	Sample size	Study design	Intervention	Peers	Comparison group	Outcome/s	Main Findings
Hatcher 2012 (14)	Nyanza Province, Kenya	N=483 diagnosed with HIV through community-based counseling and testing	Cross-sectional follow-up study of newly diagnosed, comparing those who agreed and did not agree to receive visits from peer navigators	Home visits by trained peer navigators following diagnosis, to offer support in enrolling for care.	People living with HIV/AIDS and trained in program delivery.	Newly diagnosed who did not receive visits from peer navigator	Linkage to care (self-reported)	Linkage to care was significantly higher among those receiving peer visits.
Kiweewa 2013 (15)	Kampala, Uganda (PMTCT clinic)	N=85 ART-naive women	Randomized controlled trial: participants randomized to nurse-peer intervention or standard of care (Non-inferiority trial)	Follow-up care provided by nurses and peers. Peers also performed home visits for those missing visits.	Peers living with HIV/AIDS and trained in program delivery.	Standard care	Viral suppression (<400 copies/mL) 6–12 months after ART initiation, CD4, adherence (pill count)	All outcomes similar in both groups showing non-inferiority of nurse-peer model compared to standard care.
Purcell 2007 (19)	USA (Baltimore, Miami, NYC, and San Francisco)	N=966 people who inject drugs with at least 1 opposite-sex partner in last 3 months	Randomized control trial: patients randomized to peer mentoring intervention sessions vs. video discussion intervention sessions/control arm	10 sessions led by peer mentors focused on the power of peer mentoring, utilization of HIV care and adherence, sex and drug risk behaviors	Peers living with HIV/AIDS, using drugs, at least 18 years old and were trained in program delivery.	8 group video sessions consisting of documentaries and self-help videos followed by facilitated discussion	CD4 and viral load, adherence (self-report), HIV care utilization	No significant differences between peer-mentored intervention vs. video-discussion intervention in terms of behaviors or clinical outcomes.
Richter 2014 (16)	8 Clinics, KwaZulu-Natal, South Africa	N=1200 pregnant women	Clustered randomized controlled trial: clinics were randomized to standard of care for PMTCT or enhanced intervention	Four antenatal and four postnatal intervention sessions with peer mentor	Women living with HIV/AIDS, child bearing, good social skills and were trained for 2 months in program delivery.	Standard of care based on national guidelines for PMTCT	Adherence to PMTCT and other behavioral outcomes.	Intervention showed improved cumulative adherence (after birth only and not during pregnancy). Other significant differences in intervention group (e.g., decreased depression).
Selke 2010 (17)	western Kenya	N=208 clinically stable adult patients, on ART for at least 3 months, with no adherence issues, and a	Randomized controlled trial: patients were randomized to	Community care coordinators conducted	Trained community care coordinators	Standard of care: monthly clinic visits	Viral load, CD4, # clinic visits	No significant intervention-control differences with

Author Year & Ref. no.)	Location	Sample size	Study design	Intervention	Peers	Comparison group	Outcome/s	Main Findings
		member of the household who was aware of their HIV status	receive intervention or standard of care (Non-inferiority trial)	monthly home assessments using personal digital assistants with decision support	were clinically stable patients with self-reported 100% adherence to ART over the 6 months before recruitment and considered by the clinic staff to be good role models for other patients			regard to detectable viral load or CD4 showing non-inferiority of peer model compared to standard of care. In this resource-constrained environment, patients in intervention group reduced burden on system, with half as many clinic visits compared with control group.
Simoni 2009 (20)	Seattle, Washington USA	N=224 adults who were ART-naïve and initiating ART or switching medication	2x3x2 factorial randomized controlled trial: patients were randomized to receive peer support, pager-messaging system, both interventions or standard of care	Peer support intervention consisted of 6 group sessions and one on one weekly phone calls	Patients living with HIV/AIDS who were currently on ART, trained and received \$20–\$30 twice monthly as incentive for their involvement	Standard care	Adherence (self-report and electronically monitored); CD4, viral load	Peer support increased adherence at 3 months but effect was not maintained. No differences in viral load or CD4.
Simoni 2007 (21)	Bronx, New York, USA	N=136 adult patients, currently prescribed ART, without dementia and psychosis	Randomized controlled trial: patients were randomized to receive peer-led social support and phone calls or standard of care	Peer support involving 6 one hour group meetings over 3 months and one-on-one weekly phone calls	Patients living with HIV/AIDS who were currently on ART, trained and received \$25–\$40 twice monthly as an incentive.	Standard care: social and mental health referrals were given when requested, otherwise no adherence assistance beyond usual care.	Adherence (self-report), viral load	No differences in viral load or any secondary outcomes at 3 or 6 months between intervention and control groups. Post hoc analyses indicated greater participation in intervention group was associated with higher adherence, higher social support and lower depression

Table 2

Summary of sample size, design, and main findings for nine included studies.

Author, Yr (Ref no)	Study Setting	Sample size		Outcomes ^d					
		n	Design	Linkage	Adherence	Retention	Viral suppression	Mortality	
Chang et al., 2010 (13)	Uganda	1336	Cluster-RCT		=	+	±	=	
Enriquez et al., 2014 (18)	USA	20	RCT		+		+		
Hatcher et al., 2012 (14)	Kenya	483	Cross-sectional	+					
Kiweewa et al., 2013 (15)	Uganda	85	Non-inferiority trial		=		=		
Purcell et al., 2007 (19)	USA	966	RCT		=		=		
Richter et al., 2014 (16)	South Africa	1200	Cluster-RCT		+	+			
Seike et al., 2010 (17)	Kenya	208	Non-inferiority trial		=		=		
Simoni et al., 2009 (20)	USA	224	RCT		±		=		
Simoni et al., 2007 (21)	USA	136	RCT		=		=		

^aKey: + (positive effect of peers on outcome); = (no difference between intervention and control); + (mixed findings)

Table 3Quality assessment^a of bias in 9 studies included in systematic review

Author & Year (Ref No)	Selection bias	Study Design	Confounders	Blinding	Data collection method	Withdrawals and dropouts	Overall rating of the paper
Chang et al., 2010 (13)	1	1 (Cluster-RCT)	1	NA	1	1	Strong
Enriquez et al. 2014 (18)	1	1 (RCT)	1	NA	1	1	Strong
Hatcher et al., 2012 (14)	3	2 (Cross-sectional)	1	NA	2	1	Moderate
Kiweewa et al., 2013 (15)	1	1 (RCT)	1	NA	1	1	Strong
Purcell et al., 2007 (19)	1	1 (RCT)	1	NA	1	1	Strong
Richter et al., 2014 (16)	1	1 (Cluster RCT)	1	NA	1	1	Strong
Selke et al., 2010 (17)	1	1 (RCT)	1	NA	1	1	Strong
Simoni et al. 2009 (20)	1	1 (RCT)	1	1	1	1	Strong
Simoni et al., 2007 (21)	1	1 (RCT)	1	1	1	1	Strong

^aNote: Based on Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practice Project. Evaluation key: 1=Strong; 2=Moderate; 3=Weak; NA=Bias not applicable to that study. Overall rating: Strong if there is no weak rating; Moderate if one weak rating; Weak if two or more weak ratings